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THE WATER RESOURCES OF CECIL, KENT AND QUEEN ANNES COUNTIES

THE GROUND-WATER RESOURCES

By Robert M. Overbeck and Turbit H. Slaughter

THE SURFACE-WATER RESOURCES

By Arthur E. Hulme

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CONTENTS

TABLES

FIGURES

PLATES

THE WATER RESOURCES OF CECIL, KENT, AND QUEEN ANNES COUNTIES

The Ground-water Resources

BY

ROBERT M. OVERBECK AND TURBIT H. SLAUGHTER

ABSTRACT

Cecil, Kent, and Queen Annes Counties have a land area of 1,009 square miles and their permanent population was 61,612 in 1950. Ground-water data were obtained from about 2,100 wells and 26 springs, compiled from the reports of drillers and of well owners.

The mean annual precipitation is about 43 inches. The average daily consumption of ground water in the area is estimated to be about 4,000,000 gallons. The water is used almost entirely for farm and domestic purposes.

The northern part of Cecil County lies in the Piedmont physiographic province and is underlain by igneous and metamorphic rocks of Precambrian and Paleozoic (?) age, consisting of granodiorite, gabbro, metadacite, serpentine, gneiss, chlorite, and mica schist. Ground water occurs chiefly under water-table conditions in fractures in the hard unweathered rock and in pores and permeable zones in the weathered rock. The source of nearly all the ground water is precipitation. About half the wells in the Piedmont are dug wells. Of the drilled wells many are less than 100 feet deep. The average yield of all wells is about 11 gallons a minute. The quality of the water is generally good, although ground water from the serpentine area is hard. At a few places iron is present in noticeable amounts. Wells commonly provide sufficient water for domestic or farm use, but large yields cannot be expected from the crystalline rocks. An aquifer test in the granodiorite showed a coefficient of transmissibility of 14,000 gallons per day per foot and a coefficient of storage of 0.003.

Kent and Queen Annes Counties and the southern portion of Cecil County are in the Coastal Plain. The Coastal Plain deposits, consisting of sand, clay, sandy clay and silt, greensand, and marls, rest on the southeastward sloping surface of the crystalline rocks. The deposits form a wedge-shaped mass of material which ranges in thickness from a few inches in Cecil County to 2,500 feet in Queen Annes County. In Cecil County their maximum thickness is estimated to be 1,700 feet, in Kent County their thickness ranges from 900 to 2,200 feet, and in Queen Annes County from 1,500 to 2,500 feet.

The Coastal Plain deposits are Cretaceous, Tertiary, and Quaternary in age.

The Cretaceous rocks are of continental and marine origin; the Tertiary rocks of marine origin; and the Quaternary rocks of fluviatile and marine origin. The formations of continental origin—Patuxent, Patapsco, Raritan, and Magothy—are characterized by light-colored, buff to red, sand, silt, and clay. The sand beds are lenticular and strongly crossbedded. The Cretaceous and Tertiary marine formations—Matawan, Monmouth, Aquia, and Calvert—are characterized by dark-colored clay, silt, greensand, and marl. The Quaternary deposits consist of crossbedded sand, gravel, clay, and silt.

The most extensively used aquifers are in the Pleistocene deposits (38 percent of the wells), but the total amount of water withdrawn from these deposits is relatively small. The greatest quantity of water is probably being taken from the Aquia greensand (19 percent of the wells). The Patapsco, Raritan, Magothy, Matawan, and Monmouth formations locally are important aquifers. The Calvert formation is relatively unimportant as a source of water (1 percent of the wells).

Wells ending in the Patuxent formation have an average yield of 16 gpm; in the Patapsco, 40 gpm; in the Raritan, 35 gpm; in the Magothy, 30 gpm; in the Matawan, 38 gpm; in the Monmouth, 40 gpm; in the Aquia, 27 gpm; in the Calvert, 53 gpm; in the Wicomico, 43 gpm; and in the Talbot formation, 24 gpm.

Aquifer tests on the Patapsco formation at Elkton showed coefficients of transmissibility of 5,500 to 24,000 gallons per day per foot. A test on the Magothy at Cecilton indicated a transmissibility coefficient of 25,000 gallons per day. Tests on the Monmouth formation at Rock Hall, Massey, and Kennedyville indicate transmissibility coefficients of 4,600, 5,700 and 4,900 gallons per day respectively. Storage coefficients from these tests range from 0.0000003 to 0.0004. Tests on the Aquia greensand at Massey and Queenstown indicate a coefficient of transmissibility of 4,100 and 35,000, respectively. Storage coefficients were 0.0005 and 0.00025, respectively. At Chestertown an aquifer test on the Aquia greensand failed to give a satisfactory result for the value of T and S due probably to indeterminate boundary conditions in the aquifer. An aquifer test in the Wicomico formation at Price showed a coefficient of transmissibility of 30,000 gpd per ft. and a storage coefficient of 0.0003.

The quality of ground water in the Coastal Plain area is generally good. The content of dissolved solids is low, and pH lies within a narrow range of the neutral point. Water from several aquifers, however, contains iron in sufficient quantity to cause trouble for the domestic user. Ground water from the Patapsco, Raritan, Magothy, Matawan, and Monmouth formations is generally rather high in iron. Water from the Matawan, Monmouth, and, in southern Queen Annes County, from the Aquia greensand, is hard. At places ground water from the Wicomico formation is soft and free of iron.

The average temperature of the ground water is approximately 58°.

Three general classes of wells are used, drilled, dug, and driven. Of the approximately 2,100 wells inventoried, drilled wells constitute about 53 percent, and dug and driven wells about 47 percent.

Fluctuations of the water table since 1949 were determined by periodic measurements in six observation wells. These showed an annual fluctuation in response to recharge to and discharge from the ground-water reservoirs caused by changes in the rate and amount of precipitaton and by other factors. Fluctuations of the water level were observed in two artesian wells for a shorter period of time. No significant decline in water levels was observed. A comparison of the static water levels at Rising Sun, Massey, Millington, and Stevensville with those measured more than 40 years ago indicates no significant change in static levels in the water table or in artesian aquifers in those areas.

A rough estimate of the amount of ground water in storage in the sediments underlying the three counties is 31 trillion gallons. The amount of water recharging the deposits is about 0.4 to 0.6 million gallons per square mile per day. The present consumption of ground water is about 4,000 gallons per square mile per day, or only about 1 percent of the estimated ground-water recharge.

INTRODUCTION

Location and Extent of Area

Cecil, Kent, and Queen Annes Counties are the three northernmost counties of the Eastern Shore of Maryland. The counties (fig. 1) are bounded on the north by Pennsylvania, on the east by Delaware and by Caroline County, on the south by Talbot County, and on the west by the Susquehanna River and the Chesapeake Bay. The areas of the three counties are given in Table 1.

The location of the tricounty area is between 75°45′ and 76°30′ west longitude; and between 38°50′ and 39°44′ north latitude.

Purpose, Scope and Methods of Investigation

The purpose of the investigation was to obtain basic information on the ground-water resources of Cecil, Kent, and Queen Annes Counties.

The field work was begun in the spring of 1951, and was continued intermittently into the fall of 1956. It consisted of a study of the geology of the counties in its bearing on the occurrence of ground water and of a well canvass in which over 2,100 wells and 26 springs were inventoried (Tables 45–47). Well logs were compiled from drillers' records (Tables 48–50) and sample logs from the study of well cuttings (Tables 51–53). Chemical analyses of water samples from 41 wells and 1 spring were made by the Quality of Water Branch of the United States Geological Survey; 21 analyses were obtained from the

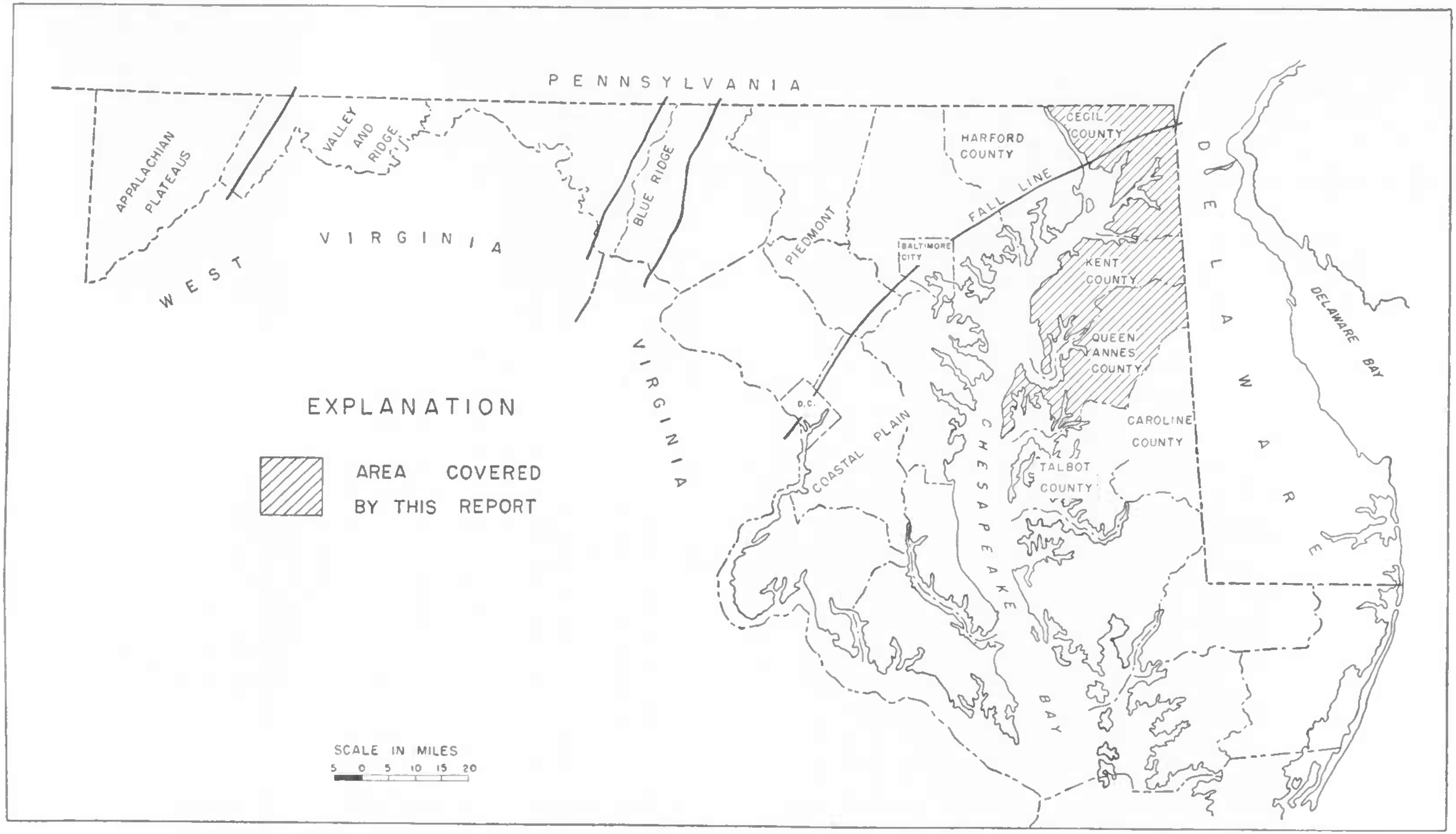

FIGURE 1. Map of Maryland showing the Physiographic Provinces and the location of Cecil, Kent, and Queen Annes Counties

Maryland State Health Department and 2 from a private firm (Table 44). Field tests for iron, hardness, and pH were made on water samples from 106 wells. Water-level fluctuations were determined by monthly measurements on 9 observation wells. Short-period continuous readings were taken to observe local effect of tide or barometric changes on the water level. Fifteen controlled pumping tests (aquifer tests) were made.

The locations of the wells inventoried are shown on Plates 1, 2, and 3. Each plate is divided into 5-minute quadrangles of latitude and longitude which are lettered alphabetically by capital letters from north to south, and by small letters from west to east. Wells within each quadrangle are numbered in the order in which they were inventoried. Each well is designated by (1) an abbreviation of the county name, (2) a combination of the marginal letters for the quadrangle in which it lies, (3) the number given the well within the quadrangle. Thus, the well numbered 10 in the quadrangle Dc in Kent County is designated Ken-Dc 10.

TABLE 1
Areas of Cecil, Kent, and Queen Annes Counties

	Land and water area (square miles)	Land area (square miles)	Water area (square miles)	Ratio water to land (percent)
Cecil	424	351	73	17
Kent	367	283	84	23
Queen Annes	487	375	112	23
Total	1,278	1,009	269	21

Previous Investigations

The first fairly detailed geologic reconnaissance of part of the tricounty area was made by McGee (1888). His purpose was to determine whether water would be found on Spesutie Island in the Chesapeake Bay if a deep well were drilled there. McGee carried his survey of the Eastern Shore as far south as the Sassafras River.

In 1902 the Maryland Geological Survey issued the Cecil County report in which the geology of the crystalline rocks was described by Bascom and that of the Coastal Plain by Shattuck. No mention is made of ground water. The State, in cooperation with the U. S. Geological Survey, published at the same time a geologic map of Cecil County (Bascom, Shattuck, and others, 1902).

The Dover folio (Miller, 1906), which includes the eastern part of Cecil and Kent Counties and the northeastern part of Queen Annes County, contains a short general description of ground water. It has a geologic map on which contour lines indicate the depth below sea level to two artesian aquifers—one in the Potomac group of Cretaceous age and the other in the Calvert formation of Miocene age. The contour lines are highly generalized because of the meagerness of the data on which they are based. The folio states that water was obtained mainly from shallow wells dug to the base of the Pleistocene deposits. No artesian wells are reported from the Maryland portion of the Dover quadrangle.

The Choptank folio (Miller, 1912), which covers only a small part of the southwestern corner of Queen Annes County, contains a short description of ground water and a geologic map on which contour lines are drawn on the top of three artesian aquifers. Three artesian wells shown on the map are in Queen Annes County—at Stevensville (203 feet deep), at Winchester (now Grasonville) (200 feet deep), and at Queenstown (100 feet deep). The wells at Stevensville and at Grasonville are reported to have yielded water of poor quality. Since that time, however, several hundred wells have been drilled to depths of about 200 feet in the area, and are yielding water that, although somewhat hard, is of good quality. Contour lines on the geologic map show altitudes below sea level for aquifers of Cretaceous, Eocene, and Miocene age.

The Tolchester folio (Miller and others, 1917), which includes much of the western part of Kent County and a small portion of the west-central part of Queen Annes County, contains a geologic map and a brief description of the ground-water resources. The water supply came at that time chiefly from shallow dug wells and springs, although a few artesian wells were in use. A map shows the location of two artesian wells at Rock Hall, 300 and 350 feet deep; one at Centreville, 665 feet deep; one at Tolchester, 60 feet deep; and one at Chestertown, 1,135 feet deep. Contour lines on the geologic map indicate depths below sea level to the base of the Magothy formation and to an aquifer near the base of the Raritan formation. Miller (p. 14) recognized that in the Potomac group the "water does not seem to come from any one bed of wide distribution, as is shown by the different depths at which it is reached and by failure to obtain any water in these beds at certain places." In the well at Centreville *Exogyra* and *Pecten* shells were found in a water-bearing stratum at 428 feet. The *Exogyra* indicates a marine bed of Late Cretaceous age (Matawan or Monmouth formation). Little mention is made of aquifers of Eocene age. These are now the principal water-yielding beds of the area.

A report issued by the Maryland Geological Survey (Clark and others, 1918), describing the water resources of the State, contains a general exposition of the water-bearing properties of the geologic formations and a brief description of the occurrence of ground water in each of the counties. Included are the records of 8 wells in Cecil County, 36 wells in Kent County, and 27 wells in Queen Annes County. Several of these wells are still in use. The logs of a few deep wells are given; the log of well Ken-Cd 3 (depth, 1,135 feet) at Chestertown is valuable for geologic correlation.

The Elkton-Wilmington folio (Bascom and Miller, 1920) includes the northeast and east-central parts of Cecil County. The water supply for the area is said to be mostly from shallow dug wells, although at a few places in the Piedmont some surface water is used. A table lists 5 wells in Cecil County.

Acknowledgments

This report was prepared and the investigations preceding it were made cooperatively by the Maryland Department of Geology, Mines and Water Resources and the U. S. Geological Survey. The work was coordinated under the general supervision of A. Nelson Sayre, Chief, Ground Water Branch, U. S. Geological Survey. The project was under the immediate supervision of W. C. Rasmussen at first and later of E. G. Otton, both district geologists of the U. S. Geological Survey. Mr. Otton contributed substantially to the preparation of the report by advice and guidance during its preparation and by reviewing and revising the completed manuscript.

Acknowledgment is due the well drillers of the tricounty area for their cooperation in providing information on drilled wells. Thanks are due the Maryland State Department of Health for making available analyses of waters and records of public-supply wells. Also to be thanked are the many well owners who willingly supplied information about their wells.

Geography

Population and Culture

The permanent population of the tricounty area is 86 percent rural. A large floating population during the summer months inhabits the shores of the Bay and its estuaries. The State Park at Elk Neck reported 185,735 visitors during 1956. Since the opening of the Bay Bridge in 1952, the population has been increasing rapidly in Queen Annes County near the eastern terminus of the bridge.

The population (U. S. Dept. of Commerce, 1950) of the three counties is shown in Table 2 and that of the principal towns in Table 3.

Farming and raising livestock and poultry are the chief agricultural activities in Cecil, Kent, and Queen Annes Counties. Commercial fishing, oystering, and crabbing are seasonal occupations along the Chesapeake Bay shore. Canning and packing sea foods and vegetables is an important business. Little manufacturing is carried on, and there are no heavy industries. Cecil County was reported to have 49 manufacturing establishments; Kent County, 22; and Queen Annes, 16 (Md. Dept. of Labor and Industry). The accommodation of summer visitors is an important source of income to the counties. The value of agricultural products (U. S. Dept. of Commerce, 1956) is shown in Table 4. Wheat, corn, and vegetables are the leading crops for Cecil and Kent Counties; and wheat and corn for Queen Annes County. Poultry raising is very important in Cecil and Queen Annes Counties (value, $1,218,672).

TABLE 2

Population of Cecil, Kent, and Queen Annes Counties in 1950

County	Total	Urban	Rural
Cecil	33,356	5,245	28,111
Kent	13,677	3,143	10,534
Queen Annes	14,579	—	14,579
Total	61,612	8,388	53,224

TABLE 3

Population of Principal Towns in 1950

County	Town	Population
Cecil	Elkton	5,425
	North East	1,517
	Chesapeake City	1,154
	Port Deposit	1,139
Kent	Chestertown	3,143
	Rock Hall	786
Queen Annes	Centreville	1,804
	Queenstown	316

TABLE 4

Value of Farm Products Sold in 1954

	Cecil County	Kent County	Queen Annes County
Livestock products	$4,883,266	$3,872,669	$5,644,227
Forest products	24,289	14,359	53,622
Crops	1,642,630	2,958,278	2,854,160
Total	6,550,185	6,845,306	8,552,009

The distribution of land use in the counties (U. S. Dept. of Commerce, 1955) is shown in Table 5. In Cecil County 71.1 percent of the land was in farms; in Kent County, 84.5 percent; and in Queen Annes County, 82.1 percent.

The three counties have excellent primary and secondary highways. U. S.

40 crosses the central portion of Cecil County, passing through Elkton. U. S. 213 is the principal north-south road and extends from Elkton in Cecil County to Wye Mills in Queen Annes County. U. S. 50 crosses Queen Annes County, extending from the Bay bridge to Ocean City.

The main lines of the Baltimore and Ohio and of the Pennsylvania Railroads cross Cecil County. The area is served also by branch lines of the Pennsylvania Railroad. Bus lines connect most of the towns and villages. Steamboats make regular trips from Baltimore to Betterton and to Tolchester Beach during the summer. The Chesapeake and Delaware Canal, serving ocean-going vessels, connects the Chesapeake Bay by way of the Elk River and Back Creek with the Delaware River.

The eastern shore is joined to the western shore by the Chesapeake Bay bridge which was opened in July 1952. Its eastern terminus is on Kent Island at Stevensville. The bridge and the connecting highways are having a favorable influence on the economy of the Eastern Shore.

TABLE 5

Farm, pasture, and forest acreage in Cecil, Kent, and Queen Annes Counties in 1954

	Cecil	Kent	Queen Annes
Farms (total number)	1,185	711	977
Land area of county (acres)	225,280	181,760	238,720
Land in farms (acres)	160,135	153,571	196,018
Total cropland (acres)	91,218	108,909	135,434
Pasture land (acres)	44,750	30,878	39,539
Woodland (acres)	37,514	26,001	42,087
Irrigated land (number of farms)	6	5	6
Irrigated land (acres)	333	732	172

Physical Features

The tricounty area, except northern Cecil County, lies within the Coastal Plain physiographic province (fig. 1). Northern Cecil County is in the Piedmont province. The line or "zone" separating the Coastal Plain from the Piedmont province is called the Fall Line. It is the outcropping zone of contact between the rather gently dipping surface of the hard crystalline rocks of the Piedmont and the overlying, more gently dipping, unconsolidated Coastal Plain sediments. Because of the low dip of the contact surface and the large difference in rate of erosion between the hard and the soft rocks, the "line" in Cecil County is a zone from 1 to 2 miles wide. Both crystalline and sedimentary rocks are found within this zone. In Cecil County the Baltimore and Ohio Railroad follows roughly the north and northwest border of the zone and the Pennsylvania Railroad the south and southeast border.

The Fall Line is a physiographic boundary that has guided the settlement of the Atlantic Coast since Colonial times, for south and southeast of it lay deep water transportation and north and northwest of it lay water power for mills. The Fall Line also separates different areas of the occurrence of ground water.

The Piedmont Plateau

The Piedmont Plateau crosses Maryland and Pennsylvania in a belt about 50 miles wide (fig. 1). A small portion of the southern part of this belt lies in Cecil County, where it forms a gently rolling upland surface, having an average elevation of about 350 feet above sea level, interrupted by rather narrow, steep-sided valleys, 100 to 200 feet deep. The surface is most deeply dissected by erosion in the west, northwest, and northeast parts of the county, less deeply dissected along the Fall Line, and only slightly dissected in the central and northcentral parts. The highest point (elevation, 535 feet) in the tricounty area lies near Rock Springs in the northwest corner of Cecil County, close to the Susquehanna River.

The Coastal Plain

The Coastal Plain in the tricounty area has two types of topography—the Western Shore type and the Eastern Shore type. The Western Shore type occupies a relatively small portion of the Coastal Plain lying close to the Fall Line. Elk Neck has the surface features that characterize the Western Shore type. Gradations into the Eastern Shore type are found on the necks south of the Elk River, and along the Sassafras River. The rest of the area has the surface features that characterize the Eastern Shore.

Western Shore type.—The topographic features of the Western Shore type are much like those of the Piedmont Plateau—a rolling upland dissected by narrow steep-sided valleys with streams of rather steep gradients. A difference, however, is that the beds of the Coastal Plain streams are incised into soft unconsolidated rocks, whereas those of Piedmont streams are cut into hard crystalline rocks. In the Fall Zone the streams begin their downcutting in soft rocks and end in hard rocks.

Eastern Shore type.—The Eastern Shore type covers about one-third of Cecil County and all Kent and Queen Annes Counties. It is made up largely of two plains having slightly different altitudes—the Talbot plain and the Wicomico plain.

The Talbot plain, which has an elevation ranging from below sea level to 45 feet, has its greatest lateral extent along the Bay from northern Kent County to southwestern Queen Annes County. Its surface tilts gently toward the Bay, except on Kent Island. A low scarp, about 20 feet high, marks at many places the landward limit of the plain and tidal marshes or low cliffs its seaward side.

Kent Island lies wholly within the Talbot plain, and the surface of the plain there has a slightly eastward inclination toward Kent Narrows—suggesting the Chester River may at one time have flowed along the east side of Kent Island.

The Wicomico plain, which has an elevation ranging from 45 to 80 feet, forms the surface of most of Kent, Queen Annes, and the southern part of Cecil Counties. Although it has the general appearance of a flat, featureless plain, this is true for only some parts of it. The Wicomico plain has four noticeably different topographic features—features that influence the infiltration, storage, and movement of ground water. These are: (1) a small-scale replica of Western Shore topography on most of the necks near the Elk River and the Bay, where the plain is much cut up by short steep-sided streams and ground-water storage is limited because of the excellent drainage of the surficial aquifers; (2) very broadly rolling plains moulded by a weak drainage system where the infiltration rates are high and the volume of saturated sediments is larger, as in southern Cecil County and in Kent County; (3) hummocky plains made by numerous basin-like depressions which are generally without surface drainage and at places contain ponds or are swampy, common in the eastern parts of all three counties (Rasmussen and Slaughter, 1955, p. 26–28) and seen on Route 213 about 5 miles south of Elkton; (4) flat featureless plains forming the broad stream divides, as in the vicinity of Massey in Kent County and east of Centreville in Queen Annes County.

Drainage.—The streams which flow across the Coastal Plain are generally sluggish and weed-choked although deep at places. Many of the smaller tributaries are intermittent and flow only at times of heavy rainfall or after thaws in the spring. As the gradients of the streams are low, erosion of the banks and transportation of material are slight. Streams which empty into the estuaries commonly end in marshes or weed-filled lakes or lagoons. Since the rainfall of the area is fairly heavy and the upland areas are rarely marshy or soggy, the absence of streams in some places indicates that an effective underground drainage system in the surficial deposits carries off the water.

The stream pattern of the Coastal Plain differs somewhat in each of the counties (Plates 1, 2, and 3). The Bay and its estuaries are drowned valleys, and the present land surfaces represent the old hills and upland plains that formed the watersheds of the streams. The drainage patterns of the present streams are determined largely by the altitude, position, trend, and form of the old divides. The general altitude of the principal divides is about 80 feet. The divide may hold one general trend, it may swing gradually from one trend to another (Kent County), or it may zigzag sharply (Cecil County). The divide may be a rather narrow ridge (Elk Neck), or it may be a vague line on a broad flat plain (southeastern Cecil, eastern Kent and Queen Annes Counties). Differences in these factors cause a variety of stream patterns and consequently a

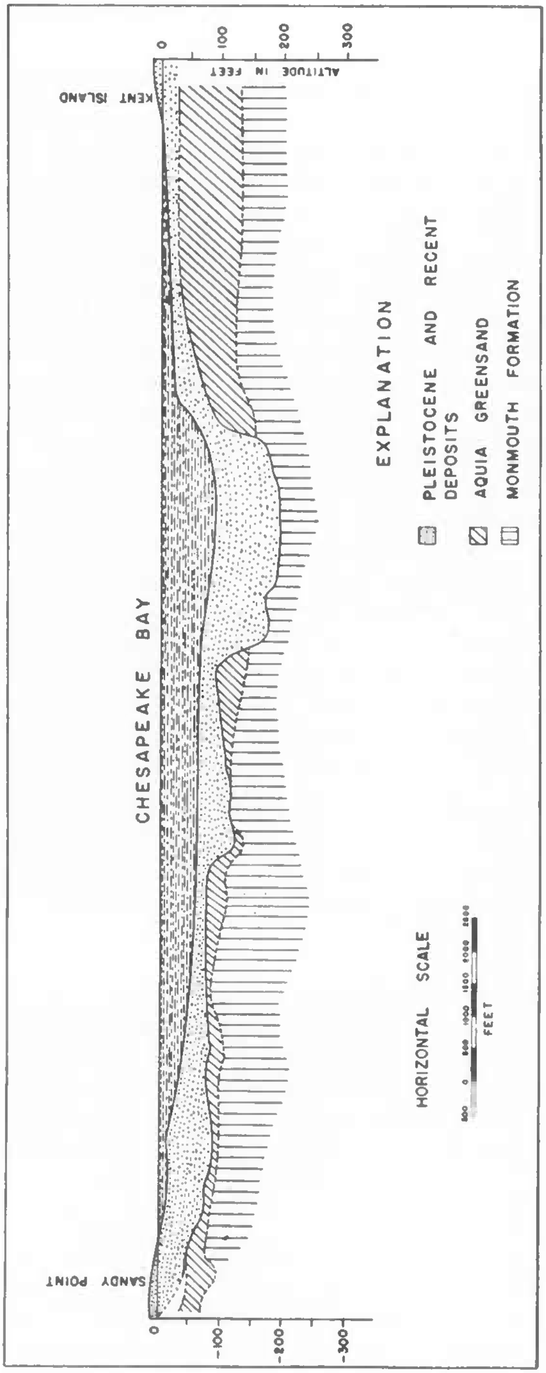

FIGURE 2. Geologic Profile across the Chesapeake Bay between Kent Island and Sandy Point

variety in the size and shape of the stream basins and shallow ground-water reservoirs. Geologic structure or rock type appears to have had little or no effect in determining the course of the streams.

The streams of the Cecil County coastal plain are short, and most of them have steep gradients.

The streams of Kent County are few and short. Morgan Creek is the longest stream in the county. The divide which separates streams flowing north into the Sassafras River from those flowing south into the Chester River has a general westerly direction from Massey to Stillpond. At Stillpond the divide splits—one branch continuing west, the other turning southwest to Rock Hall—gradually losing altitude from a maximum of about 100 feet.

The stream pattern of Queen Annes County is controlled by a flat divide which extends southwestward from the northeast corner of the county. From the divide, which has an average altitude of about 80 feet, the streams flow north and west into the Chester River and south into the Tuckahoe and Wye Rivers. Many of the streams which lie on the flat divide are intermittent streams.

Broad estuaries of the Chesapeake Bay—the Elk, Sassafras, and Chester Rivers—slice across the area almost to the Delaware State line. Small estuaries make a fretwork of the shores. Land which has been cut off from the mainland forms large islands—Eastern Neck, Kent, and Wye Islands.

The trend of Chesapeake Bay at its head is normal to the course of the Susquehanna River and parallel to the Fall Line (fig. 1) and to the structural trend of the underlying rocks (Pl. 4). The Chester River from Millington, westward and southward to Kent Narrows, follows the structural trend of the Aquia greensand. The Bohemia and Sassafras Rivers cut across the structural trend.

Rapid modification of the shore line of the Bay and its estuaries is going on at places through shore erosion and deposition. This must be considered when a well is to be dug or drilled near the Bay shore. Erosion is generally indicated by steep bluffs along the shore, and deposition by wide beaches, sand flats, and bars across the mouths of streams and estuaries. The rapidity of the erosion is indicated by the results of shore-erosion studies (Singewald and Slaughter, 1949). In Cecil County Grove Point receded 320 feet in 100 years (p. 38); in Kent County a maximum recession of 700 feet occurred along the Bay front between Tolchester Beach and Swan Point (p. 64); and in Queen Annes County, Bloody Point receded 1,250 feet in 100 years (p. 70).

Figure 2 is a profile of the Chesapeake Bay as determined by boreholes along the line of the Chesapeake Bay Bridge (Greiner Co., 1948). It shows both the profile of the present bottom of the Bay and the bedrock profile. The bedrock profile is that of an asymmetrical terraced valley eroded when sea level was much lower than now (Ryan, 1953, p. 13–14).

Climate

Of the elements that constitute climate, precipitation and evaporation are the most directly related to the movement and storage of ground water. Precipitation includes rain, snow, sleet, hail, dew, and frost; evaporation includes surface and subsurface evaporation and transpiration by plants. Precipitation adds water to the land; evaporation takes it away. Evaporation is influenced chiefly by temperature, humidity, and air movement.

TABLE 6

Average Monthly Temperature and Precipitation in Cecil and Kent Counties

(temperature in degrees F and precipitation in inches)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Cecil County													
Elkton (period, 1926–1952; altitude, 28 feet)													
Temperature	33.0	33.4	42.4	51.8	63.2	71.8	75.9	74.1	68.0	56.0	45.8	35.1	54.2
Precipitation	3.39	2.91	3.75	3.67	4.32	4.11	4.38	5.48	3.17	3.20	3.26	3.02	44.74
Kent County													
Chestertown (period, 1898–1952; altitude 35 feet)													
Temperature	33.1	33.2	42.3	52.4	63.6	71.5	76.2	74.4	68.4	56.7	46.0	35.9	54.6
Precipitation	3.47	3.00	3.52	3.65	3.78	3.96	4.21	4.21	3.38	3.08	2.96	3.46	42.69
Rock Hall (period, 1898–1952; altitude 5 feet)													
Temperature	34.5	34.8	44.2	53.0	60.2	72.9	77.0	75.3	69.5	58.3	47.2	36.6	55.6
Precipitation	3.52	3.07	3.52	3.55	3.37	3.47	4.77	4.82	3.61	2.92	2.92	3.09	42.63
Millington (period, 1898–1952; altitude 27 feet)													
Temperature	34.1	34.2	42.2	—	63.6	71.6	76.1	74.2	68.6	57.3	46.3	36.2	55.0
Precipitation	3.69	3.18	3.81	3.58	3.42	3.64	4.53	4.80	3.51	2.90	2.82	3.49	43.43

The tricounty area has a humid equable climate (Thornthwaite, 1931). The annual precipitation averages about 43 inches; the annual snowfall, about 15 to 20 inches. Snow rarely remains on the ground throughout the winter. July and August are the months of maximum and November the month of minimum rainfall. Severe droughts and storms are somewhat unusual. Seasonal changes in climate are well marked.

Meteorological stations have been maintained for many years by the U. S. Weather Bureau at Chestertown, Rock Hall, and Millington in Kent County, and for a shorter time at Elkton in Cecil County. A station has recently been established at Centreville in Queen Annes County. The Rock Hall station lies on the Chesapeake Bay shore; that at Millington inland near the axis of the Maryland-Delaware peninsula; that at Chestertown between the Bay and the axis; and that at Elkton in the Fall Zone. Table 6 shows the average monthly and annual temperature and precipitation for the four stations.

The average annual temperature for the stations is not significantly different. At all stations July is the hottest month and January the coldest month. Elkton

TABLE 7

Monthly Precipitation at Elkton, Cecil County, 1950–1954

(in inches)

	1950	1951	1952	1953	1954
Jan.	1.89	3.53	5.48	5.82	2.26
Feb.	3.35	3.55	2.79	3.28	1.38
Mar.	5.13	3.61	5.88	6.14	4.22
Apr.	1.27	2.34	7.03	4.58	3.06
May	3.56	3.49	5.61	7.33	2.85
June	3.27	4.52	2.32	1.68	.23
July	3.16	7.33	6.53	2.45	.60
Aug.	2.05	1.38	2.61	1.92	3.82
Sept.	6.56	1.64	4.45	3.65	3.52
Oct.	2.96	2.76	.51	4.05	2.66
Nov.	5.36	6.58	5.41	2.50	4.13
Dec.	2.09	5.19	3.93	4.04	3.03
Total	40.65	45.92	52.55	47.44	31.76

TABLE 8

Monthly Precipitation at Chestertown, Kent County, 1950–1954

(in inches)

	1950	1951	1952	1953	1954
Jan.	2.36	2.82	5.21	5.23	4.05
Feb.	3.25	3.20	2.11	2.75	1.02
Mar.	5.22	2.69	5.21	5.83	4.86
Apr.	1.77	4.19	6.69	3.80	2.83
May	5.59	3.22	4.41	4.90	4.66
June	2.40	6.35	3.43	2.22	3.43
July	4.18	4.59	2.52	6.84	2.94
Aug.	1.16	0.53	7.44	3.09	4.20
Sept.	8.01	1.04	3.42	1.92	2.43
Oct.	2.47	3.30	1.25	4.46	3.18
Nov.	4.66	6.54	5.20	2.69	3.78
Dec.	2.78	5.91	3.83	3.61	2.49
Total	43.85	42.28	51.22	47.34	39.87

has an average growing season of 179 days, Millington 188 days, and Rock Hall 195 days (Weeks, 1939, p. 58–59). The last killing frost in the area is in April or early May, and the first killing frost in October.

Average annual precipitation shows but slight differences among the stations. Elkton has the highest average, owing possibly to the effect of rising air currents near the hills north and east of Elkton. Rock Hall and Chestertown have the lowest average precipitation. August is the month of greatest rainfall for all the stations; February the lowest at Elkton, and November the lowest at the other three stations. At Elkton the average number of days on which 0.1 inch or more fell is 110 days; at Chestertown 106 days, at Rock Hall 113 days, and at Millington 113 days.

TABLE 9

Percent of Monthly Precipitation falling in One Day at Chestertown in 1953

Month	Percentage
January	33
February	42
March	60
April	16
May	19
June	44
July	51
August	46
September	52
October	66
November	44
December	36

The monthly precipitation for the years 1950–1954 at Elkton and Chestertown is given in Tables 7 and 8.

Table 9 shows the percentage of precipitation that fell on one day in each month of 1953 at Chestertown. The table illustrates the pattern of distribution in 1953. The pattern would be somewhat different for each year. In 1953, 38 percent of the total precipitation occurred on only 12 days.

REGIONAL GEOLOGY

Geologically, Maryland may be divided into three parts—the Appalachian Mountains, the Piedmont Plateau, and the Coastal Plain—that differ markedly in rock type and geologic structure. The Appalachian Mountains form the western part of the state; the Piedmont Plateau, the central and east-central part; and the Coastal Plain, the eastern part.

The rocks of the Appalachian Mountains are folded sediments of Paleozoic age consisting of sandstone, shale, limestone, and conglomerate.

The rocks of the Piedmont Plateau are metamorphic and igneous—mica schist, chlorite schist, phyllite, quartzite, gneiss, granite, granodiorite, diabase, gabbro, and related types. The metamorphic rocks were originally like the rocks of the Appalachian Mountains but were transformed, or metamorphosed, by high temperature and pressure into rocks different texturally and mineralogically from them. The igneous rocks were intruded molten into the metamorphic or into the sedimentary rocks. The age of the rocks of the Piedmont is not definitely known, but it is believed that they are largely of Paleozoic age (Cloos, 1937, p. 31–35).

A narrow belt of sedimentary rocks of Triassic age, consisting mainly of red sandstone and shale, crosses Maryland in Frederick and Carroll Counties.

The rocks of the Coastal Plain are unconsolidated sand, clay, silt, and gravel. The marine deposits generally show parallel bedding. Lenticular bedding and crossbedding predominate in the continental deposits. The beds were deposited on the seaward tilted, eroded surface of the Piedmont Plateau. Continental deposits were laid down first; later as the sea level rose, marine deposits accumulated on top of them. During the Ice Age (Pleistocene) and Recent times many oscillations of sea level took place. As the surface of crystalline rocks on which the Coastal Plain sediments were deposited dips seaward at about 60–150 feet to the mile and the sea bottom at 5 to 6 feet to the mile, a wedge-shaped mass of sediments resulted.

The Coastal Plain deposits comprise about 85 percent of the surface of the tricounty area and are the depositories of most of the ground water. The Piedmont rocks occupy about 15 percent of the area and are the depositories of the rest of the ground water.

The Appalachian Mountains lie well outside the tricounty area, but erosion of the mountains furnished much of the material that makes up the early Coastal Plain deposits. The material comprising the Pleistocene deposits was derived in part from erosion of the Appalachian and Piedmont rocks to the west, but in much larger part from glacial debris moved down from the Appalachian area to the north by melt waters flowing through the Susquehanna and Delaware River valleys.

GENERAL PRINCIPLES OF GROUND-WATER OCCURRENCE

The general principles underlying the origin, storage, and movement of ground water have been described in detail by Meinzer (1923 and 1949), Tolman (1937), and others. They are touched on very briefly here and only insofar as they explain technical terms used in the report.

Ground water is derived almost entirely from precipitation. It is the portion of the precipitation (rain or melting snow chiefly) that moves from the land surface into the soil by infiltration and thence into underground storage and circulation. Ground water is defined as water in the zone of saturation. Of the water that falls on the land surface only about one-third gets into the ground-water reservoirs. The greatest losses occur through evaporation and transpiration.

The direct surface runoff is the portion of the precipitation which has not gone underground, but runs over the surface as streams. Total runoff includes ground water that discharges into streams, maintaining their base flow. In the Rock Creek basin direct runoff amounts to about 9 percent of the total precipitation (Dingman and Meyer, 1954, p. 39); in the Little Gunpowder Falls basin, 13 percent (Dingman and Ferguson, 1956, p. 50); in the Beaver Dam basin, 10 percent (Rasmussen and Andreason, 1957, p. 16); and in the Big Elk Creek basin roughly 15 percent of the total precipitation. Total surface runoff in these basins amounts to 29, 40, 36, and 43 percent of the precipitation, respectively.

The infiltration capacity of the soil depends on many factors of which the most important are the texture and composition of the soil. In the tricounty area most of the land is cultivated and forested areas are small (16 percent). The soil is generally loamy or sandy. That the infiltration capacity varies, however, in conformity with the soil type is illustrated by the fact that in some areas farm ponds retain water and in others they do not. In eastern Kent County and in northeastern Queen Annes County, most of the basin-like depressions, if not artificially drained, contain ponds and swampy grounds. The ponds are really perched water tables because at many places they can be drained by sinking a well through the clayey bottom to an underlying permeable bed. In central and southeastern Queen Annes County, these depressions are largely self-draining.

The rate and amount of infiltration depends also on climatic conditions. When precipitation takes place, the first requirement it must fulfill is to make up the moisture deficiency in the soil. After this has been satisfied the water is free to move downward or over the surface. If the rainfall is heavy, runoff occurs as a sheet movement over the surface to the streams. This water does not reach the ground-water reservoir unless the stream bed is above the water table and loses water to it. A slow long-continued rain or melting snow will contribute most to the ground-water supply. In the growing season or in the winter when the ground is frozen hard, little water gets into the ground-water system.

The process whereby the water of infiltration becomes ground water is called recharge. When the ground-water reservoir is full and more water is added, excess water will move out of the reservoir as springs or seeps. This excess water is called ground-water discharge or runoff. It keeps the streams flowing after direct runoff has ceased.

Ground water is stored in, and moves through open spaces in the rocks. The property of a rock whereby it contains openings is called its porosity. Porosity is expressed in percentages. It is the ratio of the total volume of the rock occupied by openings to the total volume of the rock. A rock having a porosity of 25 percent is three-fourths solid rock and one-fourth openings. Open spaces in rocks differ greatly in size, shape, and arrangement, depending on the physical character of the rock in which they occur. The fresh crystalline rocks are only slightly porous, and openings in them are along fractures, joints, and parting planes, and planes of cleavage or schistosity. In the weathered crystalline rock and in the Coastal Plain deposits, the openings are the interstices or pores between gravel, sand, clay, and silt grains. The shape, assortment, and compaction of the grains determine the porosity of the rock.

The size of openings in an unconsolidated rock is one of the chief properties of the rock that controls the movement of water though the rock or storage in it. Large openings, such as those in a well sorted coarse gravel bed, permit the free passage of water. In small openings the effects of molecular forces that impede the flow of water under gravity, or head, become marked. In rocks having very small openings, such as silt or clay beds, most of the water under naturally stable conditions is held fast and the bed is said to be impervious. Such beds are called aquicludes. The natural conditions may be changed, however, so that the pressure on the aquiclude is increased or decreased (just as water held in a sponge may be squeezed out by the pressure of the hand). The withdrawal of water from an aquifer in a confined system, for example, causes an increase of rock pressure and water is squeezed from the aquicludes into areas of lower pressure.

The water in a rock that is not held in storage by molecular attraction is called the specific yield of the rock. It is water that is free to drain out of the rock under natural conditions.

As water sinks downward from the surface through openings in the rocks, it reaches a certain level, called the water table, below which is a zone in which the openings are filled with water under hydrostatic pressure—the zone of saturation. Above the water table the openings are only partly filled with water—downward-moving or held by molecular attraction. The direction of motion of water in the saturated zone generally has a predominately horizontal component in the direction of the hydraulic gradient. The water table is a gently undulating surface which commonly conforms roughly to the major undulations of the land surface. The water table is a free surface that fluctuates slowly as water is added to or taken away from the ground-water reservoir. The position of the water surface in a water-table well coincides with the water table around the well. The position of the water surface in an artesian well coincides with the piezometric surface at the well—that is, the position the free surface takes when the aquifer is under artesian pressure. The water level in an artesian well rises above the water-bearing stratum, but an artesian well is not necessarily a flowing well. A flowing well results only when the artesian head is sufficient to raise the level above the collar of the well at the land surface. In some artesian wells drilled near tidewater, tidal forces may cause an artesian well to flow part of the time. Flowing wells are rare in the tricounty area.

Several terms are used in describing the hydrologic properties of a water-bearing bed, or aquifer, that require definition. The capacity or ability of a rock or formation to transmit water under pressure is called its permeability. The field coefficient of permeability is the number of gallons a day at the prevailing temperature that would flow through a cross-section 1 foot square under a unit hydraulic gradient, that is, a difference of 1 foot in head in 1 foot of travel. A term more frequently used is coefficient of transmissibility (T) which is the field coefficient of permeability multiplied by the thickness in feet of the saturated part of the aquifer.

The definition of the coefficient of storage adopted in February 1955 by the U. S. Geological Survey is:

> "... the coefficient of storage of an aquifer is the volume of water it releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface ..."

Since the coefficient is a ratio, it is expressed as a decimal fraction. It is very small for an artesian aquifer, generally between 0.001 and 0.00001. In a water-table aquifer the coefficient of storage is for practical purposes equal to the specific yield of the aquifer, and is usually between 1 and 20 or 30 percent.

The "safe yield" of an aquifer is the yield "at which water can be withdrawn from an aquifer for human use without depleting the supply to such an extent that withdrawal at this rate is no longer economically feasible" (Meinzer, 1923, p. 55). Overpumping may cause such great lowering of the water level that neighboring wells are deprived of water or are forced to install other types of pumps. It may lower the hydrostatic pressure of the wells so far as to permit the encroachment of salt or brackish water from bodies of surface water. Or it may affect the head relationship between two aquifers so that the water from an aquifer containing poor water may enter and contaminate the water of an aquifer containing good water.

Ground water is commonly in very slow motion in the rock or aquifer in which it occurs. A popular misconception is that water moves underground in rivers analogous to those on the land surface. Under natural conditions the velocity of water underground rarely exceeds more than a few feet a day. Water in some of the aquifers in the area has traveled hundreds of years to reach its present location. The velocity of the water depends on the permeability of the rock in which it occurs and on the hydraulic gradient or head under which it moves, and where these are low the water barely moves at all.

In this tricounty area discharge from the ground-water reservoirs is almost entirely a natural discharge. Artificial discharge through pumps is a very small part of the total discharge. Natural discharge takes place through seeps and springs, chiefly along the sides and bottoms of streams. Discharge may also take place through evapotranspiration if the plant roots reach the saturation zone or if the water table is very near the land surface. In confined aquifers due to leakage through breaks or slight permeability in the confining beds, water may move from one aquifer into another or even to the land surface. Some moves down the dip beneath the coast, eventually to discharge into the ocean.

Discharge of Ground Water—Big Elk Creek Basin

The Big Elk River lies in eastern Cecil County. A gaging station was maintained on the river at Elk Mills and a ten-year record is available from April, 1932 to September, 1943. The drainage basin has an area of 52.6 miles, part of which is in Pennsylvania. During the above period, it had an average discharge of 885,000 gallons per day per square mile.

The mean annual precipitation is 43 inches. The average runoff at the gaging station was 18.53 inches, and the extremes were 22.77 and 12.65 inches. Average loss due to evapotranspiration, then, is approximately 24.5 inches, which is about 57 percent of the total precipitation. Total runoff is therefore 43 percent of the precipitation and consists of surface runoff and ground-water runoff.

Dingman and Ferguson (1956) found that in a basin of similar character (the Little Gunpowder Falls in Baltimore and Harford Counties) 66 percent to the total runoff is the ground-water runoff. This figure can perhaps be used for the Elk River basin without significant error. For the Elk River, then, the ground-water runoff is about 12.2 inches or 28 percent of the total precipitation. Direct surface runoff is 6.3 inches or 15 percent of the total precipitation. Rasmussen and Slaughter (1955, p. 190) showed that in the Beaverdam basin of Wicomico County about 65 percent of the total precipitation was lost by evapotranspiration. The area is underlain by Pleistocene and Recent sediments.

Determination of the Hydrologic Properties of Aquifers by Means of Pumping Tests

The hyrologic properties of an aquifer may be determined from carefully controlled pumping tests, but it is difficult to find places where the necessary requirements for the tests are fulfilled. Usually the pumping well should be producing from only one aquifer, and the effects on water levels of other pumping wells should be such that they can be allowed for in the analysis of the data obtained from the test. The specific-capacity method and the aquifer-test method are practical field methods used to determine the hydrologic characteristics of aquifers.

The specific capacity of a well is determined by measuring the yield of a pumping well and the decline of the water level in the well. It is expressed in gallons per minute for each foot of drawdown of the water level and is a rough index of the aquifer's capacity to yield water. The specific capacities of wells, computed from data reported by well drillers, have been tabulated for individual aquifers and are discussed in the sections describing the geologic formations. The drawdown or decline of the water level in the pumped well is proportional to the logarithm of time rather than directly proportional to the time since pumping started. Thus, in an arithmetic plot of water level, the apparent leveling off of the pumping water level does not necessarily indicate stabilization of the yield of the well. Unless the change of water level is measured to the accuracy of 0.01 foot, and not simply to the nearest foot, an erroneous conclusion can be reached regarding the apparent stabilization of water levels of a pumped well.

The aquifer-test method is used to determine the coefficients of transmissibility and storage of an aquifer. These coefficients are used to forecast pumping water levels, to determine the amount of ground water available under different hydrologic situations, to determine the most efficient and economical spacing of wells, and to aid in solving many related hydraulic problems. The basic data used to compute the coefficients are obtained by measuring very carefully the yield of a pumping well in gallons per minute and the change in water level in the pumping well (when possible) and in one or more observation wells. The distance between pumping and observation wells is also accurately measured. Water level measurements of the recovery of the drawdown cone are also made after pumping has ceased as a computation check.

The drawdown data are analyzed by a method developed by Thiem (1906) and discussed by Wenzel in detail (1936, 1942), or by a method developed by Theis (1935). The Thiem formula, the basic equilibrium formula, is used to determine the coefficient of transmissibility by measurement of differences in drawdown or recovery in two observation wells. The formula is applicable only when the hydraulic system has reached a state of steady flow—that is, when the cone of depression has essentially reached equilibrium shape. The Theis formula can be used to determine both the coefficients of transmissibility and of storage by use of one or more observation wells in which measurements are made of the change of water levels during drawdown or recovery. The Theis formula includes the factor of time and thus does not require the hydraulic system to be in a state of equilibrium. The Theis formula is the basic nonequilibrium formula. Both formulas are based upon the following assumptions: (1) the aquifer is homogeneous and capable of transmitting water equally readily in all directions, (2) the discharging well penetrates and receives water from the entire thickness of the aquifer, (3) the aquifer has infinite areal extent, (4) the aquifer has a uniform thickness. The equilibrium formula is based on the additional assumptions that pumping has continued at a uniform rate over sufficient time to reach a steady state for the hydraulic system and that flow is laminar. The nonequilibrium formula is based on the further assumptions that the well has an infinitesimal diameter, that water removed from storage is discharged instantaneously with decline in head, and that flow of water toward the well is radial or two-dimensional.

A variation of the Theis nonequilibrium formula devised by Cooper and Jacob (1946) is used to determine the hydrologic coefficients. This method serves as a check against the other methods and helps to average out human error inherent in the matching of data to type curves. Procedures of analysis and their applicability are summarized by Brown (1953).

A graphic illustration of the use of the coefficients of transmissibility and storage is shown in figure 3 portraying the theoretical lowering of water level in the vicinity of a pumping well of constant discharge, after 30, 180, and 400 days of continuous pumping. The difference in water levels between 180 and 400 days is much less than the difference between 30 days and 180 days of continuous pumping. In other words, the decline of the water level is logarithmic with time.

Aquifer tests were made on wells ending in the following geologic units and at the following places:

Geologic unit	*Location*
Pleistocene deposits	Barclay, Queen Annes County
do	Price, Queen Annes County
do	Elkton, Cecil County
Aquia greensand	Massey, Kent County
do	Chestertown, Kent County
do	Queenstown, Queen Annes County
Monmouth formation	Massey, Kent County
do	Kennedyville, Kent County
Matawan and Monmouth formations	Rock Hall, Kent County
Magothy formation	Cecilton, Cecil County
Patapsco formation	Elkton, Cecil County
do	Camp Rodney, Cecil County
Crystalline rocks	Rising Sun, Cecil County

GEOLOGIC FORMATIONS AND THEIR WATER-BEARING PROPERTIES

The lithology and water-bearing properties of the geologic formations that crop out or are found in wells in the tricounty area are briefly described in Table 10. A map of the geologic formations of the upper Chesapeake Bay area is shown on Plate 4. The actual outcrops of the formations are usually con-

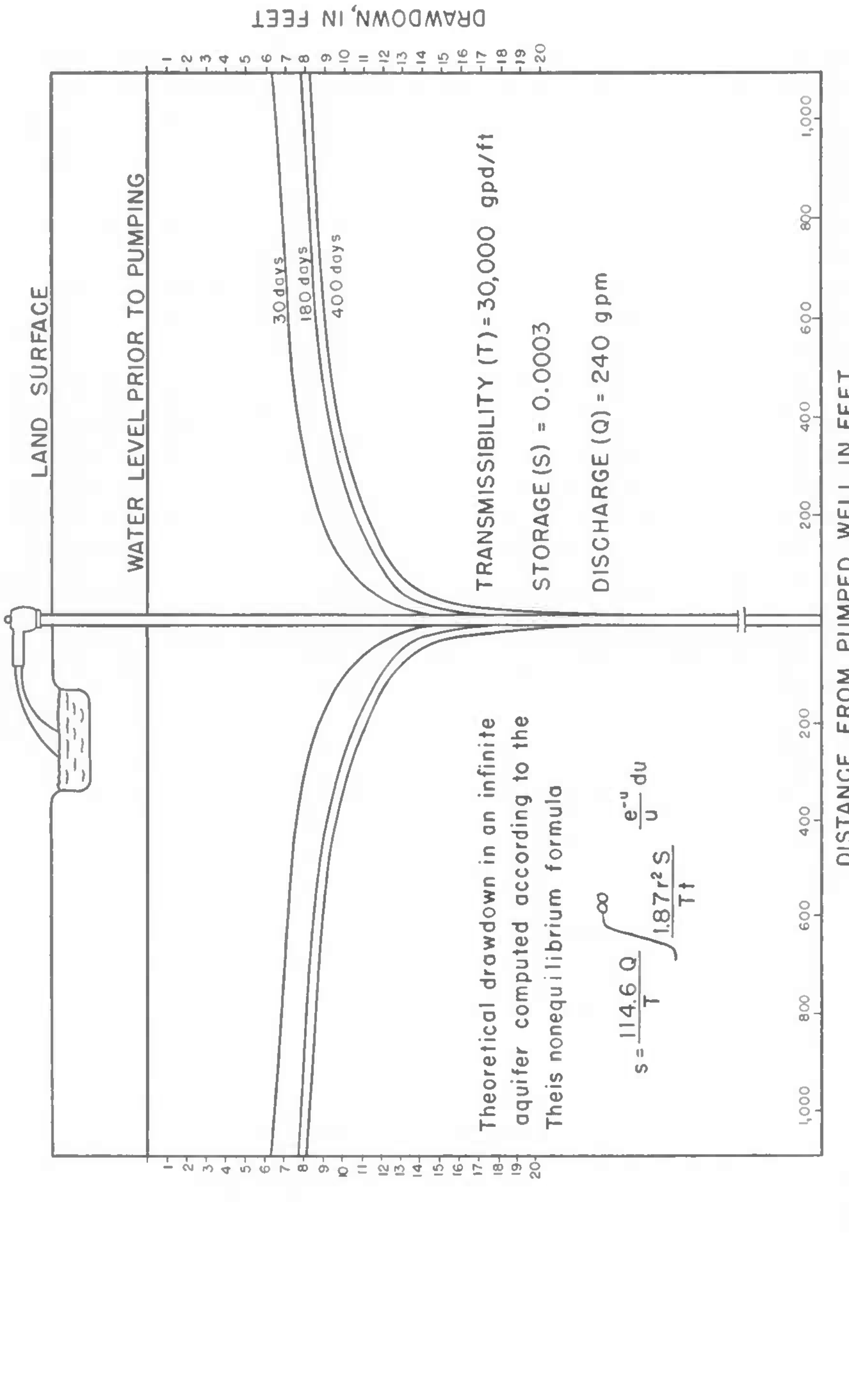

FIGURE 3. Drawdown Graph showing the Theoretical Lowering of Water Level near a Pumping Well

TABLE 10

Geologic Formations and Their Water-bearing Properties in Cecil, Kent, and Queen Annes Counties

System	Series	Group	Formation	Thickness (range in feet)	Lithology	Water-bearing properties
Quaternary	Recent		—	0–10	Silt and sandy loam soil; tidal marshes and beach sand.	Unimportant as a source of ground water. A few wells in sands near estuaries.
Quaternary	Pleistocene	Columbia	Talbot Wicomico Sunderland	0–20 20–80 0–20	Sand and gravel, clay, and sandy clay, lenticular, cross-bedded, and variable. Fluvial and marine in origin.	Wicomico formation is the most widely used aquifer in the area. Talbot and Sunderland formations are not important aquifers. Water of good chemical character obtained from dug or driven wells.
Tertiary	Pliocene (?)		Brandywine and Bryn Mawr gravels	0–20 0–20	Coarse sand and gravel. Fluvial in origin.	Unimportant as a source of ground water. Occurs as isolated patches on hilltops.
Tertiary	Miocene		Choptank	Unknown	Sand, silt, and shell layers in counties to the south. Possibly present only in southeastern Queen Annes County	Only a fair aquifer in Caroline and Talbot Counties.
Tertiary	Miocene		Calvert	15–165	Chiefly sandy clay and shell beds. Much blue clay reported in well logs. Marine in origin.	Not an important aquifer in the area. Water-bearing mainly in southeast Queen Annes County.
Tertiary	Eocene	Pamunkey	Piney Point	Unknown	Not recognized in wells in the area. May be present in subsurface in south and southeast Queen Annes County.	An excellent aquifer in counties to the south and in southern Maryland.
Tertiary	Eocene	Pamunkey	Nanjemoy	0–100	Chiefly gray and brown clay in wells on Kent Island. At Grasonville, chiefly greensand. Marine in origin.	An aquiclude in vicinity of Kent Island, but may be water-bearing at Grasonville and eastward in Queen Annes County.
Tertiary	Eocene	Pamunkey	Aquia greensand	60–230	Brown, silty greensand in Kent County and northern Queen Annes County. Greensand alternating with thin hard lime-cemented beds in southern Queen Annes County. Marine in origin.	The most important source of ground water in Queen Annes County. Several hundred wells yield from it on Kent Island and at Queenstown and Grasonville. Also public supply wells at Chestertown in Kent County.
Tertiary	Paleocene		Brightseat	—	Not recognized in the area. May be present in subsurface in southern and southeastern Queen Annes County.	Not regarded as an aquifer.

TABLE 10—*Continued*

System	Series	Group	Formation	Thickness (range in feet)	Lithology	Water-bearing properties
Cretaceous	Upper Cretaceous		Monmouth	80–100	Brown glauconitic sand and sandy clay; iron-bearing. Marine in origin.	An important water-bearing formation in Kent County. Water tastes of iron. Probably an aquiclude in southern Queen Annes County.
			Matawan	50–65	Dark gray, micaceous, glauconitic sand and silty sand. Marine in origin.	An important water-bearing formation in Kent County. Probably an aquiclude in southern Queen Annes County. Water commonly tastes of iron.
			Magothy	0–80	Dark gray carbonaceous clay and white sand. Estuarine (?) and continental in origin.	An important potential source of water in Kent and Queen Annes Counties. Water tastes of iron in many localities.
			Raritan	0–237	Chiefly fine sand and sandy clay. Lenticular and crossbedded. Non-marine in origin.	Used chiefly in Cecil and Kent Counties, but an important potential source of water in all three counties. Water commonly tastes of iron.
		Potomac	Patapsco	130–1,100	Chiefly pink and mottled clay; also sandy clay, fine sand, and some coarse sand or gravel; lenticular and crossbedded. Non-marine in origin.	Used chiefly in Cecil County, but an important potential source of ground water in Kent and Queen Annes County.
	Lower Cretaceous		Patuxent	125–500	Chiefly light-colored clay, sandy clay, and fine sand; some coarse sand or gravel, lenticular, and crossbedded. Non-marine in origin.	Few wells tap this formation. Water generally tastes of iron. Salt water reported at Chestertown.
Precambrian and Paleozoic (?)			Crystalline rocks	Indefinite depth	Igneous and metamorphic rocks: granodiorite, gabbro, metadacite, serpentine, chloritic and mica schist.	Important source of domestic supply in northern Cecil County. Most wells less than 150 feet deep. Chemical character generally satisfactory.

cealed by a thin mantle of Pleistocene and Recent deposits. The depths below sea level of the top or bottom of some of the water-bearing formations are indicated on Plates 6, 7, 8 and 10.

Precambrian and Paleozoic Crystalline Rocks

Distribution

Hard crystalline rocks of the Piedmont Plateau underlie about 190 square miles of the surface area of Cecil County. The dissected surface of these rocks slopes toward the south and southeast at an inclination of from 60 to 150 feet to the mile, and disappears at the Fall Zone beneath the softer Coastal Plain rocks.

Rock Types

A complex of metamorphic and igneous rocks underlies the Piedmont area of Cecil County (Plate 5). The metamorphic rocks are mica and chlorite schists, gneisses, and metadacites. The igneous rocks are both intrusive and volcanic. Contained in the intrusive bodies are large numbers of wall rock inclusions. The older intrusive rocks (such as the gabbros) and the extrusive rocks (the dacites) show varying degrees of metaporphism; the granodiorites show little metamorphism.

The chief igneous rock types of the area are granodiorite (hornblende, biotite, biotite-hornblende varieties), gabbro and associated ultrabasic rocks (chiefly peridotite and serpentine), and metadacite. Dark-colored diabasic dikes are very common. Aplite, pegmatite, and granite porphyry dikes are also present. Quartz stringers are common at places and are important hydrologically as their presence is marked by an increase in the number of fractures and crevices in the rocks.

The age relations of the igneous rocks are discussed by Cloos and Hershey (1936) and by Hershey (1937). The Port Deposit granodiorite, the largest of the intrusive bodies, contains the youngest rocks.They intrude gabbro, metadacite, and schist. The gabbro, in turn, is intrusive into metadacite and schist. Probably of the same age are the serpentine and ultrabasic rocks. The volcanic rocks (metadacites) are the oldest.

Openings in the Rocks

The water-bearing properties of a rock mass depend on the number, size, shape, and distribution of the openings in the rocks. Openings are of two kinds—primary openings formed at the same time as the rock and secondary openings formed later. The crystalline rocks of the Piedmont area have a very low primary porosity, one percent or less (Dingman and Meyer, 1954, p. 19, Table 7). Hence the primary porosity has little effect on the movement and storage of ground water.

Secondary porosity in the region is of two major types—openings formed by the dynamic action of large earth forces (faulting, etc.) and those formed by the weathering of the rocks.

Rocks subjected to dynamic earth forces, where these are sufficiently great, become plastic and develop flow and fracture cleavage, as in the schists, gneisses, and metadacites. However, where these openings are very closely spaced and not interconnected, they are of little importance in controlling the movement of water. Subsequent to the crumpling and folding of the rocks, later forces acted on the rigid rocks and caused extensive fracturing and movement along the fractures. These fractures are the principal openings in the unweathered rock. The most noticeable fractures are the regional tension joint systems which are strikingly seen in the quarries along the Susquehanna River above Port Deposit (Hershey, Pl. 17). The openings vary in spacing and width, although, in general, they are not wide. Shear zones are very common in the area (Hershey, p. 139). Faults are more persistent and extend to greater depth than joints and minor fractures. Since the various rock types have different physical properties, they fracture differently. Very brittle rocks, such as pegmatites and quartz veins, are more fractured and therefore better waterbearers than less brittle rocks such as mica schist.

Weathering is of two general kinds—physical and chemical. Physical weathering is caused by the expansion and contraction of the rock under surface temperature changes and by gravitational forces which cause the widening of cracks by wedging. Chemical weathering is essentially the formation of new minerals from original minerals that are unstable under atmospheric temperatures and pressures. Water, particularly when acidified with carbon dioxide and organic acids, is the chief agent of chemical weathering. Weathering breaks down and comminutes the hard crystalline rocks, forming a porous mantle of soil, subsoil, and partly altered rock. The material at the surface depends in part on the type of rock below. Rock weathering to clay forms subsoils that are porous, but not highly permeable; rock containing much quartz forms soils that are both permeable and porous; serpentine forms almost no soil. Different rocks have different susceptibility to weathering. It is common to find a drilled well penetrating a relatively hard unweathered rock above a soft highly weathered rock. Such soft rocks are reported by some drillers as "quicksand". Investigations of wells by electric logging by Bennett and Meyer (1952, p. 26–28) and others indicate variations in weathering at different depths. Weathering also tends to enlarge pre-existing fractures and joints by solution of their walls, thereby increasing storage capacity and permeability.

Table 11 shows the range in thickness of the weathered mantle and the percent frequency of the wells drilled through various thicknesses of weathered rock. The thicknesses are based on the depth at which casing is set in the well. It is common practice among the drillers in the crystalline-rock area to set casing on the first hard rock encountered. The table shows that more than half the wells (55 percent) penetrate 0 to 49 feet of weathered rock. The average thickness of the weathered zone in Cecil County is 48 feet. In the highly dissected Oakwood and Colora areas the thickness of the weathered zone is less than 50 feet in 90 percent of the wells; in the Rising Sun and Calvert areas (mature upland topography) the thickness is greater than 50 feet in 87 percent of the wells.

The topography of the Piedmont area is an important element in determining the thickness of the weathered zone. Moving water, both surface and underground, is the principal agent that removes the products of weathering. Where the velocity of the water is relatively high, as on steep hillslopes, the soil is generally thin at the top of the slope owing to its rapid removal by water. It correspondingly thickens in the lower part of the slopes. In the valleys the thickness of the weathered zone depends in part on the width of the valley and on the gradient of the stream draining it. On mature, flat, upland surfaces, such as those of much of north-central Cecil County, where weathering has

TABLE 11

Thickness of Weathered Zone in the Crystalline Rocks in Cecil County

Thickness (range in feet)	Number of wells	Percent frequency
0– 24	43	21
25– 49	70	34
50– 74	53	26
75– 99	28	14
100–124	7	4
125–149	2	1
0–149	203	100

TABLE 12

Yields of Crystalline-rock Wells in Cecil County

Range in yield (gallons per minute)	Number of wells	Percent of wells in yield groups
0.1– 9	125	58
10 –19	60	28
20 –29	14	7
30 –39	9	4
40 –68	7	3
0.1 –68	215	100

gone on for a long time, the weathered mantle is thickest, as much as 150 feet in places.

Yield of Wells

Geologic features bearing on yield of wells are: rock type, degree and extent of fracturing, topography, and weathering. The reported yields of the drilled wells average about 11 gallons a minute, and the specific capacity averages 1.6 gpm/ft. of drawdown. The reported yields are probably somewhat low because commonly the yield tests are made before the well is fully developed. Table 12 shows the percent distribution of wells in different yield groups.

None of the wells had a yield of more than 68 gpm and 86 percent of the wells produced less than 20 gpm.

Rock type and yield

A relationship would be expected between rock type and well yield because different kinds of rocks have different physical characteristics, such as tensile strength and resistance to fracturing and differences in susceptibility to weathering. The Cecil County Piedmont, however, is not a good place for such a study because of the complexity of the rocks (Plate 5). Furthermore, deep weathering at most places conceals the character of the underlying rock, making its classification uncertain. Comparatively few well cuttings were available to aid in classification of the rocks. Other factors, such as topographic location

TABLE 13

Average Depth and Yield of Crystalline-rock Wells in Cecil County by Geologic Units

Rock type	Depth (feet)			Yield (gpm)		
	Number of wells	Range	Average	Number of wells	Range	Average
Contact zones	32	18–160	64	20	5–30	14
Granodiorite	180	14–294	70	108	0.1–68	12
Gabbro	37	25–109	57	23	3–20	9
Metadacite	23	24–226	93	22	0.5–42	8
Serpentine	18	11–215	61	9	3–14	8
Schist	65	13–150	69	32	3–15	7

and degree of development of the well, may be more effective in determining yield than rock type.

Table 13 shows the average yield and the average depth of the wells according to the type of rock in which they were drilled. The relative size of the areas of rock outcrop is roughly indicated by the number of wells penetrating the various rock types. Granodiorite underlies the largest area and serpentine the smallest. The average yields for the various rock types are only approximations because the yields reported for many wells by the drillers are only estimates. The validity of the value determined for serpentine is affected also by the small number of wells used in figuring the average.

Wells penetrating contact zones have the highest average yield (14 gpm), and wells penetrating the schist and metadacite have the lowest average yield. The average depth of wells in the various rock types ranges from 57 to 93 feet. In general, little significance can be attached to the depths, although the greater average depth of the metadacite wells may indicate that many wells in this rock type are drilled deeper in an attempt to obtain a greater yield.

The comparatively high average yield (14 gpm) from wells penetrating contact zones is to be expected, for in these zones the rocks are likely to be more highly fractured and creviced. Also intrusive quartz or pegmatite bodies are probably more common in the contact zones. The low average yield of the schist wells (7 gpm) is well below the value of 11 gpm reported for similar rocks by Dingman and Ferguson in Baltimore and Harford Counties (1956, p. 20). Possibly the schists in Cecil County are less weathered and fractured than in the other counties.

Topography and yield

In Table 14 wells are grouped according to their location on upper hillslopes or on lower hillslopes. Almost no wells inventoried were on the very tops of hills, and very few were in the valley bottoms. A division was made between

TABLE 14

Topography and Yield of Wells in the Crystalline Rocks in Cecil County

Yield (gpm)	Upper hillslope Number of wells	Lower hillslope Number of wells
0– 4.9	10	8
5– 9.9	30	12
10–14.9	14	16
15–19.9	5	6
20–24.9	3	8
Total	62	50

wells on the upper slopes of hills and those on the lower slopes, as it was expected that, since the area of recharge was less for the upper slopes than for the lower slopes, the wells on the lower slopes would give the highest yields. The average yield of wells on the upper hillslopes is about 9 gpm and on lower hillslopes about 12 gpm. Topography, therefore, is an important factor governing the yield of a crystalline-rock well. Wells located in valley bottoms adjacent to streams will generally have the highest sustained yields provided the valley fill is permeable and the stream bed not silted over. The stream serves as the principal recharge source.

The weathered zone and yield

As the weathered zone acts as a storage reservoir for the underlying denser and less pervious crystalline rocks, a tabulation of drilled wells was made to determine whether a relationship exists between thickness of the weathered zone and the yields of wells. Table 15 shows that the highest average yield is from wells where the weathered zone is less than 25 feet thick. Where the weathered zone is thicker there is only a slight decrease in the average yield with increasing thickness. Two wells penetrating an exceptional thickness of the weathered zone, more than 124 feet, are omitted from the table. The average yield of these two wells is 17 gpm, a value which may be fortuitous, but suggests that the yields of these rock wells are governed chiefly by factors other than the depth of weathering.

TABLE 15

Thickness of Weathered Zone and Yield of Wells in the Crystalline Rock Area in Cecil County

Thickness of weathered zone (feet)	Number of wells	Average yield
0– 24	40	14.1
25– 49	62	10.4
50– 74	47	9.3
75– 99	25	7.0
100–124	7	8.9
0–124	181	

TABLE 16

Yield of Wells in the Crystalline Rocks in Cevil County by Depth Intervals

Range in depth (ft.)	Number of wells	Number of wells in yield range					Yield (gpm)	
		0–4.9 gpm	5–9.9 gpm	10–14.9 gpm	15–19.9 gpm	20 and over gpm	Average	Per foot of well
0–49.9	44	3	14	12	5	10	12.6	0.34
50–99.9	118	21	50	24	13	10	9.4	.14
100–149.9	34	16	12	2	2	2	8.5	.07
150 and over	17	3	5	2	0	7	20.8	.10
Total	213	43	81	40	20	29	10.8	0.14

Depth and yield

Wells in the crystalline rocks are relatively shallow. Ninety-two percent are under 150 feet deep and 76 percent less than 100 feet deep. Only 17 wells are deeper than 150 feet. Additional deep wells would be needed to determine statistically the relationship between yield and depth of wells below 150 feet.

Table 16 shows the number of crystalline-rock wells and their average yield in four depth intervals and the number of wells in five yield ranges from 0 to over 20 gpm. The most common yield range is 5 to 9.9 gpm. The most common depth interval in this yield range is 50 to 99.9 feet. The highest average yield is 20.8 gpm for 17 wells 150+ feet deep. The reason for this anomaly is probably that many of these wells were drilled for commercial or institutional supplies and were tested for their maximum yield. In general, the yield per foot of well decreases below a depth of 50 feet. This conclusion is substantiated elsewhere in the Maryland Piedmont (Dingman and Ferguson, p. 34).

Water-bearing Properties

Hydrologic coefficients

Rising Sun test.—On July 9, 1953 an aquifer test was conducted at Rising Sun by utilizing public-supply wells Ce-Ac 38 to -Ac 40. The test was run to evaluate the hydrologic coefficients of the Port Deposit granodiorite (gneiss) at Rising Sun.

To determine the subsurface character of the rocks, test hole Ce-Ac 26 was drilled by the rotary method on January 31, 1956 to a depth of 97½ feet. It is located between wells Ce-Ac 37 and -Ac 39. The distance between pumping well Ce-Ac 37 and observation wells Ce-Ac 39 and -Ac 40 is 125 and 136 feet, respectively. The cuttings show an upper clay and underlying soft rock layers to a depth of 45 feet, mixed clay and weathered rock (saprolite) from 45 feet to 87 feet, and hard gneissic rock (granodiorite?) with much clear vein quartz from 87 feet to 97½ feet. Although the locality has been mapped geologically at the surface, the only available detailed subsurface data are from the test hole.

Well Ce-Ac 38 was pumped 2 hours and 5 minutes prior to the start of the test in order to establish a pre-test water-level trend. It continued pumping during the test to supply water to the town. Its pumping rate of 68 gpm was determined by means of an orifice and piezometric tube. Well Ce-Ac 37 was pumped for 240 minutes at a rate of 50 gpm. Water in excess of the town's needs was discharged to a nearby stream. Water level measurements were made in observation wells Ce-Ac 39 and -Ac 40 with automatic water-stage recorders. At the end of 240 minutes, well Ce-Ac 37 was shut off and measurements were made of the recovery of the water levels for 100 minutes.

The coefficients of transmissibility and storage obtained from the water levels from wells Ce-Ac 39 and -Ac 40 averaged 14,000 gpd per foot and 0.003, respectively. Plotting of drawdown and recovery curves for the comparatively short duration of the test did not disclose any recharge or discharge boundaries. According to the test data, a small stream about 40 feet from the observation wells did not recharge the aquifer during the period of pumping. This is corroborated by the log of well Ce-Ac 26 which shows an impervious clay at the surface.

An aquifer test of longer duration may disclose recharge or discharge boundary conditions which might affect the computation of the hydrologic constants of transmissibility and storage. The coefficients of transmissibility obtained by this aquifer test are well above the average values (2,300 to 5,300 gpd/ft.) obtained for similar rock types in Harford and Baltimore Counties by Dingman and Ferguson (1956, p. 22).

Comparison of the static water levels in 1956, about 6 feet below the land surface, with those in 1918, also about 6 feet (Clark and others, 1918, p. 266), shows there has been no extensive dewatering of the aquifer at Rising Sun as a result of pumping from the public-supply wells.

Springs

Many springs are found in the county although few of them are used as a source of domestic water supply. Twenty-one springs used for farm or domestic purposes were inventoried. The springs have estimated yields ranging from less than 1 to 27 gallons a minute. Eight of the springs issue from rock fractures; eight are seepage springs; and three issue from contact zones. Only three of the springs are reported as having gone dry at any time.

The largest spring (Ce-Bb 23) was flowing at the rate of about 24,000 gallons a day in September 1953. Its flow ranges from about 18,000 gallons a day in October to 40,000 gallons a day in March or April. The spring is in a steep draw at an elevation about 170 feet above the Susquehanna River. It is used to supply a swimming pool.

Springs are the partial source of the public-supply system at Perryville and Carpenter's Point.

Data concerning the springs of Cecil County are given in Table 17.

Ground-water Supply of Local Areas

Data on the water supply of local areas are summarized here. The letters after the name of the area designate the map locations (Pl. 1).

Oakwood (Aa)

Average depth of drilled wells is 56 feet; average yield is 8 gpm; yields range from 6 to 12 gpm. The terrain is strongly dissected by the Susquehanna River and its tributary, Octoraro Creek. The thickness of the weathered zone is from 8 to 50 feet. The quality of the water is generally good, but somewhat hard—120 to 186 parts per million—from wells drilled into serpentine rocks.

Colora (Ab)

Average depth of drilled wells is 49 feet; average yield is 10 gpm; yields range from 4 to 20 gpm. Thickness of weathered zone is 8 to 50 feet. The terrain is deeply cut by Octoraro Creek and its tributaries. The quality of the water is good, except for well Ce-Ab 26 in serpentine, which is very hard—205 parts per million of hardness.

Rising Sun (Ac)

Thickness of weathered zone chiefly between 50 and 100 feet. Surface generally mature except to northwest of Rising Sun. The water from this area is of good quality.

TABLE 17

Type and Yield of Cecil County Springs

Location	Type	Yield (gpm)	Permanence
Ce-Aa 7	Rock fracture	2 (est)	Permanent
Aa 11	do	2 (est)	do
Ab 23	do	12 (est)	do
Ac 36	do	3 (est)	Low in summer
Ac 18	Seepage	8–10 (rept)	Permanent
Ac 21	do	—	Dry at times
Ac 27	do	—	Permanent
Af 9	Rock fracture	10 (rept)	do
Bb 13	do	7 (est)	do
Bb 16	do	6–7 (est)	do
Bb 20	Contact	3 (meas)	do
Bb 23	Contact (?)	17–27 (rept)	do
Bb 24	Rock fracture	10 (rept)	do
Bc 17	Seepage	½ (est)	Dry in summer
Bc 30	do	—	Permanent
Bc 32	Rock fracture	1½ (est)	do
Bd 32	Seepage	1	do
Bd 33	do	6	do
Bd 34	do	3	do
Bd 57	Contact	—	do
Bf 30	Seepage	—	do

Calvert area (Ad)

Average depth is 88 feet; average yield is 8.7 gallons a minute; range in yield is 5 to 15 gallons. The thickness of the weathered zone ranges between 50 and 100 feet. The land surface, except for the southeast part, is mature. The quality of water is generally good. Some of the dug wells failed during the 1955 drought.

Fair Hill (Ae)

Average depth of drilled wells is 89 feet; average yield is 8.3 gallons; range in yield is $2\frac{1}{2}$ to 15 gallons. The thickness of the weathered zone lies between 14 and 49 feet. The area is well dissected by the Elk River and its tributaries. The quality of the water is reported generally to be good, although three wells inventoried report water slightly hard or with taste of iron.

Appleton (Af)

Average depth of drilled wells is 66 feet; average yield is 8.9 gallons; range in yield is 4 to 18 gallons a minute. The weathered zone is 22 to 75 feet thick. The land surface is rather deeply dissected by Elk Creek and the Christina River. Water is reported to be of good quality.

Port Deposit (Bb)

Average depth of drilled wells is 64 feet; average yield is 9 gallons a minute; range in yield is $1\frac{1}{4}$ to 20 gallons a minute. The land surface is deeply dissected by the Susquehanna River and its tributaries. Gravel is present in the southeast part of the area. Water is reported to be generally of good quality. Wells Ce-Bb 21 and -Bb 22, at the edge of the Susquehanna River, produce brackish water.

Craigtown (Bc)

Average depth of drilled wells is 77 feet; average yield is 7.9 gallons; range in yield is 3 to 25 gallons a minute. Most of the southern half of the area is covered by gravel or by Lower Cretaceous deposits. The land surface is well dissected by Principio Creek and its tributaries. The quality of the ground water is reported to be good.

Bay View (Bd)

Average depth of drilled wells is 68 feet; average yield is 13 gpm; range in yield is 4 to $38\frac{1}{2}$ gpm. Lower Cretaceous deposits and Pleistocene sands and gravels cover most of the area. The surface is well dissected by streams which have cut through the soft rocks into the underlying crystalline rocks. Both good water and water with taste of iron are reported.

Childs (Be)

Only 6 of the drilled wells obtain water from the crystalline rocks. The quality of the water is good.

Elk Mills area (Bf)

Only 7 of the drilled wells yield water from the crystalline rocks. Most of the area is covered with Lower Cretaceous and Pleistocene deposits. The quality of the water is good.

Perryville (Cc)

Sixteen drilled wells tap the crystalline rocks although the surficial rocks consist of sand, clay, and gravel. The average depth of the wells is 46 feet and the average yield is 5.8 gpm.

Development and Utilization

About 750,000 gallons a day of ground-water is estimated to be pumped from wells in the Piedmont area of Cecil County. Nearly all the water is used for farm and domestic purposes. A small amount is used for light manufacturing and commercial use such as fireworks plants, garages, motels, and stores. Ground water is used for the supplies of North East, Perryville, and Rising Sun.

Large ground-water supplies cannot be developed in the crystalline rocks of Cecil County. Wells will produce enough water almost anywhere in the area for farm and domestic use, but large industrial users will have to depend on surface water.

CRETACEOUS SYSTEM

The deposits of the Cretaceous system form a south to southeast dipping truncated, wedge-shaped mass which rests on the eroded surface of the crystalline rocks and is overlain by less steeply dipping Tertiary deposits. The bottom of the wedge crops out at the Fall Line, and the top in western Kent County and in the extreme southeast corner of Cecil County. At Chestertown the top of the Cretaceous strata lies about 100 feet below sea level and its base, about 1,400 feet below sea level; at Queenstown, the top is at 325 feet and the base at 1,700 feet; at Queen Anne the top is at about 650 feet and the base at 2,500 feet.

LOWER CRETACEOUS SERIES

Three formations—the Patuxent, Arundel, and Patapsco—making up the Potomac group were formerly assigned to the Lower Cretaceous series (Clark and others, 1911, p. 57). On the basis of invertebrate fossils from the oil-test well Esso no. 1 at Ocean City, Maryland (Vokes, 1948, p. 126–133), and a reinterpretation of Lull's work on the reptilian remains from the Arundel clay, the Arundel clay and the overlying Patapsco formation are now considered of Late Cretaceous age. The Arundel clay, which is best exposed in the Baltimore-Washington region, has not been found in the tricounty area.

Patuxent Formation

Distribution and Lithology

The Patuxent formation is poorly exposed in the tricounty area. It crops out chiefly as outliers and as narrow bands along the stream valleys of the Fall Zone. It is overlain unconformably by the Patapsco formation and by Pliocene(?) and Pleistocene terrace deposits. It rests on Precambrian or early Paleozoic crystalline rocks (Pl. 4 and fig. 4). Outliers of the Patuxent forma-

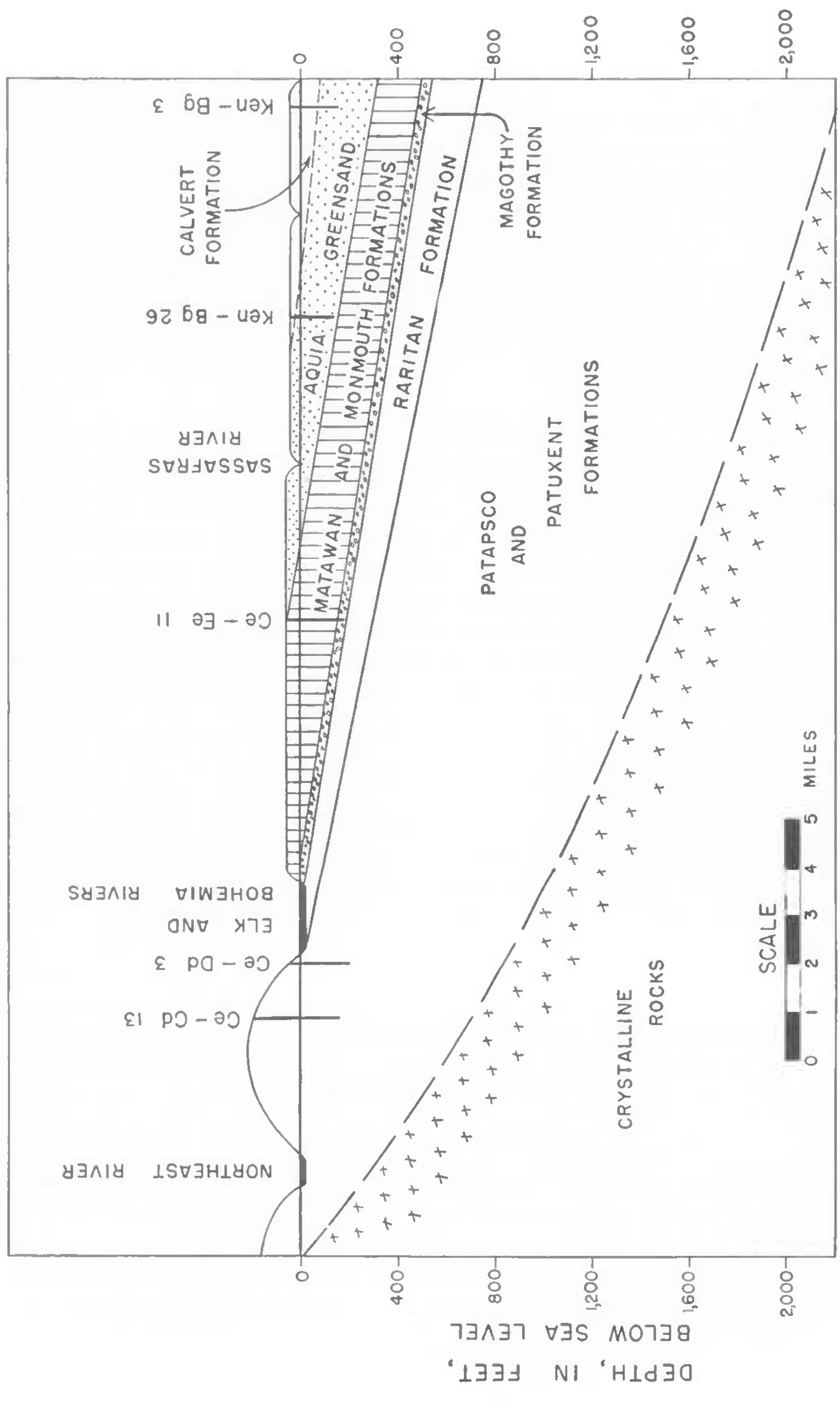

FIGURE 4. Geologic Profile from Charlestown to the Chester River (line A-A′ on Plate 4)

tion occur at Elk Mills, Singerly, Cherry Hill, Egg Hill, Bay View, and Blythedale.

The rocks of the Patuxent are of continental origin. They were probably deposited in running water and in small lakes and ponds. The fineness of the sediments, however, indicates that they were not deposited in rapidly moving water. A basal conglomerate is absent and the beds of the Patuxent rest on the residual clays of the weathered crystalline rocks. The type and distribution of the sediments indicate that the surface on which they were deposited lay above sea level and was inclined seaward at a small angle.

Lithologically the Patuxent and Patapsco formations are very similar, consisting characteristically of sand and clay, but the sands of the Patuxent formation are more micaceous and more arkosic than the sands of the Patapsco formation and the clays of the Patapsco formation are generally more highly colored than those of the Patuxent. These differences, however, are difficult to recognize in most well logs.

The sediments of the Patuxent were laid down on an erosion surface of Precambrian and Paleozoic(?) rocks. The surface is generally believed to be the continuation southeastward of one of the peneplains whose remnants are seen in the Piedmont and Appalachian regions, but this relationship has been questioned (Sharp, 1929, p. 544). Isostatic adjustment, through overloading, probably caused tilting of the plain eastward and southeastward (Pl. 4 and fig. 4). The configuration of the surface below the Coastal Plain deposits is only vaguely known. The deep weathering of the surface and the distribution of the clays of the Patuxent suggest that the surface was gently rolling. That the surface was not completely flat and featureless is shown by the emerged hills which rise more than 200 feet above its general level—Grays Hill in Cecil County and Chestnut and Iron Hills in Delaware.

The Patuxent formation consists of discontinuous beds and lenses of unconsolidated sand, clay, silt, and gravel. Clay and sandy clay are the most abundant, sand is fairly abundant, and gravel is least abundant. The clays are generally light colored—white, yellowish, pink, or red. Where much organic material is mixed with the clay, it is dark gray. The sand is mainly fine-grained, white, yellowish, or brownish in color, micaceous, and somewhat arkosic. The coarse-grained sands, which are the chief aquifers in the formation, are at places firmly cemented with brown iron oxides. Gravel is present chiefly as scattered pebbles in sand or sandy clay. A heavy basal conglomerate like that in the Baltimore area (Bennett and Meyer, 1952, p. 34) has not been seen in Cecil County. The beds of coarse conglomerate on the hilltop near Bay View, designated as Patuxent on some of the early geologic maps, are believed to be Bryn Mawr or Brandywine gravel.

Only an incomplete picture of the composition and texture of the Patuxent formation can be obtained from the poor exposures of the area. The distribution and relative thicknesses of the lithologic types can, however, be determined from the drillers' logs and well cuttings. The log of well Ce-Bf 41 (Table 48) is a typical example of the sediments in the Patuxent formation. The log is of interest chiefly because of the prevalence of fine-grained sand and clay. Neither gravel nor coarse-grained sand is reported. Other well logs showing the Patuxent formation are Ce-Be 46, Ce-Cc 12, Ce-Cc 15, and Ce-Cd 1 (Tables 48 and 51).

TABLE 18

Thickness, in Feet, of Sediments in Wells penetrating the Patuxent Formation
(data from drillers' logs)

Area or Locality	No. of wells	Clay	Sand and gravel	Sandy clay and clay and sand	Total formation penetrated	Thickness of water sand
Central Cecil County	10	121	147	134	402	55
Percent	—	30	37	33	100	14
Baltimore area[a]	35	2,129	2,936	970	6,023	77
Percent	—	35	49	16	100	49

[a] Data from Bennett and Meyer (1952, p. 35).

The partial log of well Ce-Bd 27 shows the contact between the Patuxent formation and the underlying weathered crystalline rocks:

Patuxent Formation in Well Ce-Bd 27 at North East

	Thickness (feet)
Patuxent formation:	
Clay, light yellow and blue	20
Clay, soft, gray	13
Crystalline rocks:	
Clay, stiff, gray	9
Rock, soft	16

A basal conglomerate is lacking and the gray clay in the Patuxent formation may be residual clay of the weathered basement rock. Other logs showing the contact at the base of the Patuxent are Ce-Bc 14, -Bd 16, -Bd 28, -Bd 29, -Be 9, and -Bf 46 (Table 48).

The thicknesses of the different types of sediments shown in logs of wells producing water from the Patuxent formation in Cecil County and in the Baltimore area are compared in Table 18. The proportion of sand in the Patuxent is greater than in the overlying Patapsco formation, 37 percent compared to 19 percent, but is about 12 percent less than in the Patuxent formation in the Baltimore area, 37 percent compared to 49 percent. In general, this would be reflected in lower well yields in Cecil County than in the Baltimore area.

A well at Chestertown (Ken-Cd 3), drilled to a depth of 1,135 feet, penetrates 180 feet into the upper part of the Patuxent formation. The log, described by Miller (1926, p. 101–102), shows red, gray, and purple clay (80 percent), sandy clay (5 percent), and sand (15 percent).

Structure

The Patuxent formation has an easterly strike in the eastern part of Cecil County and a northeast strike in the western part. The basal surface dips southeast about 160 feet to the mile in Cecil County. The dip of the top could not be determined from well logs, but according to the geologic map by Bascom and Miller (1920, p. 9) the formation dips southeast about 60 feet to the mile. The average dip of the Patuxent formation between its outcrop on the Western Shore and its position in the Chestertown well is about 50 feet to the mile.

Thickness

The thickness of the Patuxent formation varies because of unconformities at its top and bottom. Bascom and Miller (p. 10) estimate that its maximum outcrop thickness in Cecil County is 125 feet. Downdip its thickness increases greatly, and in the Chestertown area it is probably between 400 and 500 feet.

Water-bearing Properties

The Patuxent formation is an important aquifer in the tricounty area. Little is known, however, of its hydrologic properties except from records of a few wells drilled in or very close to its outcrop fringe. Only well Ken-Cd 3 at Chestertown has penetrated the formation at great depth (1,135 feet). The well is reported to have flowed salt water. The hydrologic data obtained from the wells near the outcrop area are probably not representative of the formation as a whole.

The formation is believed to be an important potential source of ground water, because it contains extensive sand lenses (about 25 percent of them medium-grained sand). Its outcrop extends over a large area and it underlies all the Coastal Plain province of the tricounty area—about 970 square miles. As the Patuxent is a continental deposit, its lithology and hence its hydrologic properties vary from place to place. It lacks the coarse sand and basal conglomerate present in the Baltimore area and resembles more closely the Patuxent formation of southern Maryland.

The average yield of 17 wells ending in the Patuxent formation is 16 gpm. and the specific capacity is moderate, averaging only 1.1 gpm per ft. of drawdown. As the wells were drilled for farm or domestic use, many of the reported yields do not reflect the maximum water-bearing capacity of the formation. Table 19 shows that the yields of wells ending in the Patuxent ranges from 2.5 to 90 gpm. The best well (90 gpm) is an 8-inch well with 15 feet of screen at Camp Rodney just north of Elk Neck State Park. Specific capacities range from 0.1 to 8.8 gpm/ft.

A reason for the low yields and specific capacities of many of the wells is that about half of them lie in the Fall Zone where streams have cut through

TABLE 19

Yields and Specific Capacities of Wells in the Patuxent Formation

Well No.	Yield (gpm)	Specific capacity (gpm/ft.)
Ce-Bb 1	10	—
Bb 5	10	1.0
Bc 28	20	.8
Bc 33	7	.4
Bc 34	2.5	.1
Bc 38	5	.4
Bd 26	15	—
Bd 30	20	.5
Be 6	10	.7
Cc 12	20	1.6
Cc 15	12	.5
Cc 28	8.5	.2
Cc 34	10	.6
Cd 1	14	.2
Cd 12	20	.8
Cd 32	5	.7
Cd 35	90	8.8
Average	16.4	1.0

the Patuxent formation to bedrock, leaving isolated remnants of the formation that are only partly saturated with water.

Ground water in the Patuxent formation throughout much of the tricounty area must be considered as a reserve source rather than a source likely to be tapped in the immediate future. Although the formation underlies the Coastal Plain area, it does so at ever greater depths with increasing distance from the outcrop. The reported presence of salt water in the Chestertown well poses the question of the quality of the water at great depths. No one is likely to drill to find out, so long as water of good or fair quality is available at shallower depths. The formations which overlie the Patuxent are nearly all water-bearing and have available in storage large quantities of water than can be withdrawn at less cost for drilling and pumping.

UPPER CRETACEOUS SERIES

Patapsco Formation

Distribution and Lithology

The Patapsco formation crops out at places within a belt averaging about 9 miles wide which crosses central Cecil County in a northeasterly direction from the Chesapeake Bay to the Delaware line (Pl. 4). It occupies most of the north half of Elk Neck and occurs in areas north of Perryville and Elkton. The principal outcrops are in the bluffs along the Elk River, at Carpenter Point on the Northeast River, and at places along the Chesapeake Bay. Most of the exposures are small and unsatisfactory for an overall study of the composition, texture, and structure of the rocks.

The sediments of the Patapsco were derived mainly from the crystalline rocks, and in part from strata of Paleozoic, Triassic, and Early Cretaceous age. The Patapsco formation is of continental origin, and the only fossils so far collected are the remains of land plants. The deposits were laid down on a relatively flat plain having a slight inclination to the south and southeast, as is shown by the gradual thickening of the deposits in those directions. That the sands were laid down in large part by running water is indicated by the roundness of the sand grains. The scarcity of gravel suggests deposition in lakes or in streams of low gradient. The clays are derived from the weathering of the parent rocks and were deposited in quiet water. Gray clays of marshy or shallow lake deposits are present, but are rare.

The Patapsco formation is underlain by the Patuxent formation and overlain by the Raritan formation. The three units are of continental origin, and, hence, somewhat similar lithologically. In drillers' logs it is difficult to separate the formations by their lithology, but the position of the well in relation to the outcrop of the formation, the depth of the well, and the thickness of the formation assist in correlating an aquifer. The units can be roughly separated by the fact that the Patuxent is generally micaceous and arkosic, the Patapsco contains pink and variegated clays, and the Raritan, much fine sand.

The Patapsco formation consists of unconsolidated sand, sandy clay, clay, silt, and small amounts of gravel. The clay is generally tan, buff, white, and, characteristically pink, red, and mottled pink and white. Abandoned clay pits along the outcrop of the Patapsco formation show that the clay beds were once commercially important. The sand is for the most part fine-grained. Gravel is found at places scattered through sandy clay but is rarely in continuous beds.

As the Patapsco formation is so very poorly exposed, drillers' logs had to be relied on for information about its lithologic composition. The logs, however, tell little about its textural and structural details.

The driller's log of well Ce-Cd 9 (Table 48) shows a typical section of the Patapsco formation. This log consists of 66 percent clay, 18 percent sandy clay, and 16 percent sand. Well Ken-Cd 3 at Chestertown (Miller, 1926, p. 103) shows that the formation there consists almost entirely of clay and sandy clay. Only one sand bed, 8 feet thick, is reported (Table 49).

Table 20 shows the thickness and percent distribution of the different types of sediments in drillers' logs of the Patapsco formation. Under the heading "clay and sand" both sandy clay and clay containing streaks of sand are included; and under "sand" both fine nonwater-bearing sand and water-bearing sand are included. Of 2,994 feet of the formation penetrated by the wells, only 19 percent consists of sand and gravel, 54 percent consists of clay, and 27 percent is sandy clay or clay and sand. The Elk Neck-Charlestown area has the highest proportion of sand and gravel.

TABLE 20

Thickness, in Feet, of Sediments in Wells penetrating the Patapsco Formation

(data from drillers' logs)

Area or Locality	Number of wells	Clay	Sand and gravel	Sandy clay and clay and sand	Total formation penetrated	Thickness of water sand
Elkton and West Elkton	3	159	71	89	319	24
Percent	—	50	22	28	100	8
Elk Neck-Charlestown	13	740	380	382	1,503	178
Percent	—	49	25	26	100	12
Elk Neck-Back Creek	3	81	25	239	345	22
Percent	—	24	7	69	100	6
Chesapeake City	4	640	89	98	827	48
Percent	—	77	11	12	100	6
All areas	23	1,620	565	808	2,994	272
Percent	—	54	19	27	100	9

Structure

The Patapsco formation strikes east in the eastern part of Cecil County and northeast in the western part. According to Miller (Bascom and Miller, 1920), the formation has a homoclinal southeast dip of about 40 feet to the mile. The dip could not be determined from the well logs. From the outcrop of the formation on the western shore to the Chestertown well, the dip averages about 50 feet to the mile. It is probably greater than 50 feet near the outcrop and less than 50 feet in the southern portion of the tricounty area.

Thickness

The thickness of the Patapsco formation in Cecil County cannot be determined exactly from drillers' logs as there are no sharp or characteristic breaks in lithology between it and either the Patuxent or the Raritan formation. According to Miller's estimate (Bascom and Miller, p. 10), the Patapsco is 130 feet thick at Grays Hill and 200 feet thick on the northern part of Elk Neck. In the deep well at Chestertown (fig. 5) its thickness is 374 feet.

Depth of Wells

The depths to which wells in the Patapsco formation are drilled vary from locality to locality and even from well to well within a locality. The wells inventoried show a range in depth of 23 to 363 feet. The depth to a water-bearing lens is the sum of the elevation of the well above sea level plus the depth below sea level to a water-bearing lens. Since the formation dips to the southeast 30 to 50 feet to the mile, each added mile downdip from the outcrop means an added 30 to 50 feet to drill to a given sand in the formation.

Water-bearing Properties

The Patapsco formation is made up of lenticular bodies of cross-bedded sand, clay, and sandy clay. Areally extensive beds of well-sorted sand and gravel are lacking. Where gravel is found, it is generally mixed with clay. Owing to the sharp changes in the character of the material, the permeability of the lenses differs greatly. Wells located near one another may have to go to different depths to find a lens sufficiently permeable to yield water. The lenses are probably hydrologically connected. Although individual lenses may be thin and of limited lateral extent, taken together they form a large unit of water-bearing material.

The yields of 43 wells ending in the Patapsco formation range from 3 to 120 gpm (Table 21). The specific capacities of these wells range from 0.1 to 12.5 and average 1.9 gpm per ft. of drawdown. The two best wells are Ce-Bf 53 and -Bf 56 in the outcrop area near Elkton. Both wells furnish 120 gpm with specific capacities of 3.9 and 8.0 gpm per ft., respectively. The yields and specific capacities of the wells are greater in the Elkton area than at Chesapeake City. Near the outcrop area of the formation (at Elkton) the sands are probably more permeable than they are further downdip (at Chesapeake City).

The Patapsco formation is potentially a more important water-bearing formation than it is at present. It underlies about 970 square miles of the tricounty area. It has been only slightly developed, and its possibilities as a source

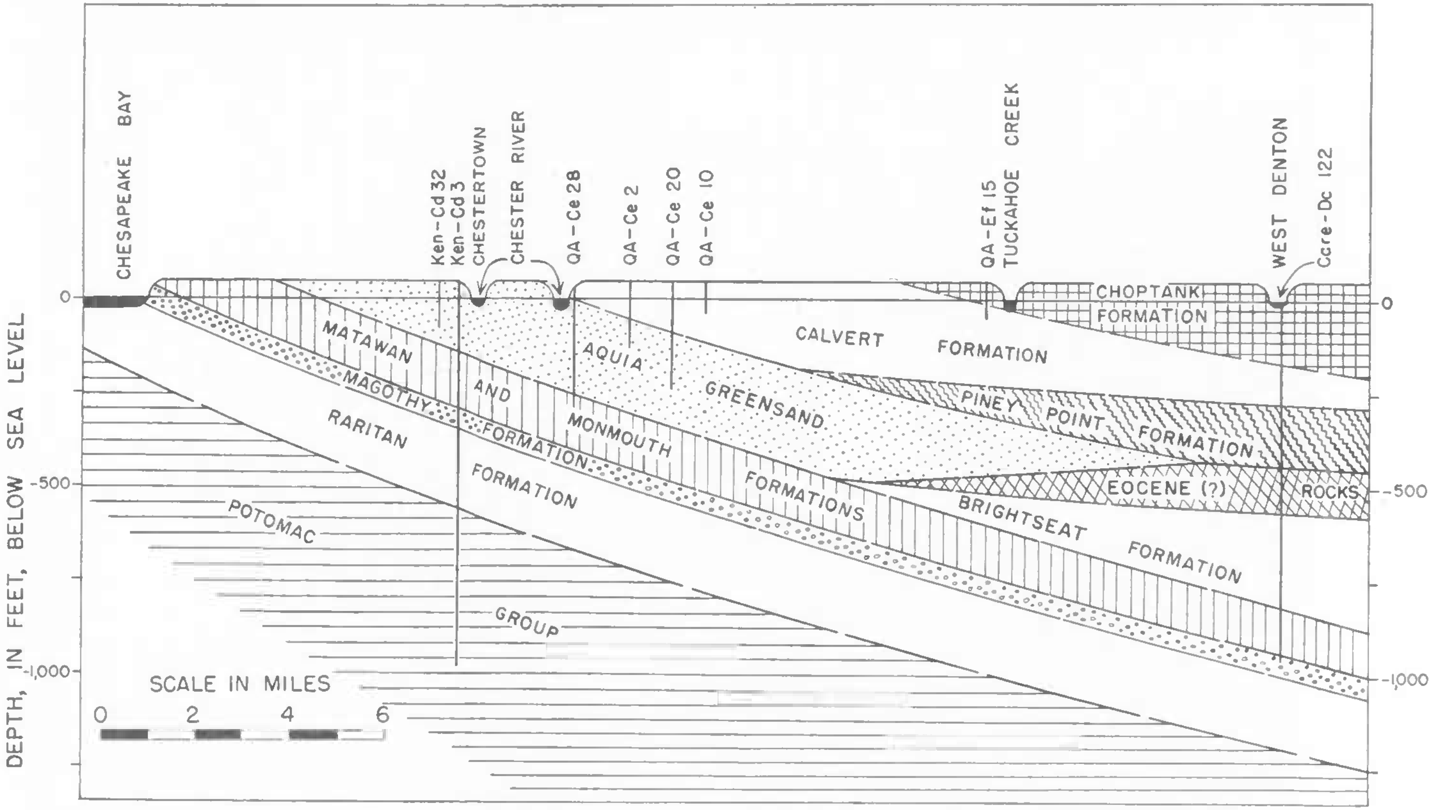

FIGURE 5. Geologic Profile from Plum Point on the Chesapeake Bay to West Denton (line B–B′ on Plate 4)

of ground water have not yet been explored. The reasons are: (1) there has been little demand for large quantities of water and shallow dug wells generally supply water of better quality in sufficient amounts for farm and domestic use; (2) the water from drilled wells is generally high in iron and treatment of the water for even domestic use is generally imperative (at Chesapeake City the water from the public supply well Ce-Cf 2 is reported to contain at times 30 to 40 ppm of iron); (3) in some wells fine sand has caused rapid abrasion of pump bearings; (4) in southern Cecil County water can be obtained at shallower depths from sands in the Raritan and Magothy formations.

Hydrologic coefficients

Elkton tests.—Aquifer tests were conducted on sands in the Patapsco(?) formation at the Olin Mathieson Chemical Corporation plant 0.9 mile west

TABLE 21

Yields and Specific Capacities of Wells in the Patapsco Formation

Area	Yields			Specific capacities		
	Number of wells	Range (gpm)	Average (gpm)	Number of wells	Range (gpm/ft.)	Average (gpm/ft)
Elkton and West Elkton	8	30–120	65	8	1.4–8.0	3.7
Chesapeake City	6	20–100	55	4	0.3–4.1	1.4
All areas	43	3–120	40	39	0.1–12.5	1.9

of Elkton and 0.2 mile north of U. S. Route 40 on September 7 and 11, 1956. The wells utilized in the tests were Ce-Be 31, 107 feet deep, with 91.3 feet of 6-inch casing and an unknown length of screen, and -Be 56, 107 feet deep, with 99.5 feet of 6-inch casing and 5 feet of screen. The log of -Be 31 shows a white and gray sand from 95 to 107 feet and that of -Be 56 a coarse white and yellow sand from 99 to 104 feet. Logs of wells Ce-Be 28, -Be 29 and -Be 30 show the top of a producing sand of undetermined thickness from depths of 74 to 94 feet. Clay is above the sands in all the wells. Well Ce-Be 31 is 320 feet distant from -Be 56. Wells -Be 28, -Be 30, and -Be 44, more distant, yielded such a small quantity of water that the effect of their pumping was considered negligible in the analysis of the test data.

On September 7, after about 24 hours of pre-test recovery of its water level, well -Be 56 was turned on and pumped for $2\frac{1}{2}$ hours at an average rate of 37 gpm. The yield was determined by measuring the time taken to fill a 55-gallon drum. Water was removed from the site via a drainage ditch. Recovery measurements of the water level were made for 120 minutes. A coefficient of transmissibility of 5,600 gpd per ft. was obtained, utilizing the Theis recovery formula (residual-drawdown straight-line method).

At the start of the drawdown phase the water level was 46.57 feet below the measuring point. At the end of the pumping phase (beginning of the recovery phase), the water level was 86.93 feet below the measuring point, the well thus having a specific capacity of 0.9 gallon per foot of drawdown, a moderately low value.

On September 11, 1956 another aquifer test was run using Ce-Be 31 as the pumped well and -Be 56 as the observation well. Well -Be 31 was pumped for 180 minutes at an average rate of 33 gpm and measurements were made of the recovery of the water level for 100 minutes. The drawdown and recovery data fit the Theis nonequilibrium type-curve well, and the modified Theis straight-line analysis did not disclose any boundary conditions for the short period of the test. A drawdown of 1.60 feet was observed in well -Be 56 after 180 minutes of pumping -Be 31. Average coefficients of transmissibility and storage computed from these data were 5,500 gpd per ft. and 0.0001, respectively. The agreement between the two sets of test data is good.

These aquifer tests of short duration indicate that at the test site, the Patapsco formation is not capable of large-scale development. Although no recharge or discharge boundary conditions were disclosed in the tests, it is known that, in and near its outcrop belt, sands in the Patapsco formation are lenticular and variable in their hydrologic properties. Thus, any proposed large-scale ground-water development should be preceded by adequate test drilling and aquifer tests of longer duration.

On October 8, 1956, an aquifer test was run on a sand in the Patapsco formation at the Salvatorian Mission farm southeast of Elkton immediately east of the junction of U. S. Routes 40 and 213, and on the north side of Route 40. Wells Ce-Bf 50 and -Bf 56 were utilized as the pumping and observation wells, respectively. Other wells in the area known to be producing from the Patapsco formation are Ce-Bf 15, -Bf 19, -Bf 20, -Bf 52, -Bf 53 and -Bf 54. These wells reportedly range in depth from 50 to 91 feet. Well diameters are from 4 to 6 inches. The top of the producing sand is from 39 to 68 feet below land surface.

On October 3, well Ce-Bf 53, located 785 feet south of observation well -Bf 56, was pumped for $1\frac{1}{2}$ hours at an estimated rate of 100 gpm. An automatic water stage recorder placed on well -Bf 56 showed 0.002 foot lowering of the water level during 80 minutes of pumping. Barometric pressure, recorded before and during the test, showed a definite relationship between the artesian water levels and changes in atmospheric pressure. The physical facilities did not allow longer preliminary test pumping of wells Ce-Bf 53 or -Bf 15. They furnish water for a housing development and are operated singly with one or the other in reserve. A storage tank pressure valve regulates the operation of the well in use, making the pumping and recovery periods frequent and irregular. Other wells in the area farther away and yielding less than wells -Bf 15 and -Bf 53 were believed to have no effect on the test results during the October 8 test.

Well -Bf 50, 320 feet northeast of -Bf 56, is 61 feet deep and contains 6-inch casing. It is screened from 50 to 60 feet, the top of the producing sand being at 45 feet. During the test it produced only 7.2 gpm using a one horsepower pump. Well -Bf 56 is 75.5 feet deep and contains 6-inch casing. It is screened from 59 to 74 feet and the top of the producing sand is at 42 feet. Well -Bf 56 is about 2 feet higher than -Bf 50.

Before and during the test altimeter readings were made at 15 minute intervals at well -Bf 56. The altimeter pressure readings were converted to barometric pressure expressed in feet of water. Computations indicated a barometric efficiency of 40 percent. The test lasted 435 minutes. Recovery measurements were not made. Total observed drawdown was 0.023 foot, and extrapolated water level-drawdown increment was 0.049 foot. Analyses of the data according to the Theis nonequilibrium and modified nonequilibrium formulas indicated an average coefficient of transmissibility of 16,000 gpd per foot and an average coefficient of storage of 0.005.

The values of the coefficients of this test are of the general order of magnitude for the Patapsco formation in the area, but probably are only a rough approximation. Before future ground-water development is undertaken in the area of this test additional aquifer tests of longer duration should be conducted. The coefficients indicate moderate ground-water development of the Patapsco formation is possible in the Mission farm locality.

Camp Rodney test.—On September 14, 1956 an aquifer test was conducted at Camp Rodney, Elk Neck, utilizing well Ce-Cd 35 which is the only well producing from the Patapsco(?) formation within a radius of half a mile. The well was drilled in 1955 to a depth of 180 feet and has an 8-inch casing and 15 feet of screen. The top of the producing sand is 154 feet below land surface. Elevation at the well site is about 100 feet above sea level.

The well was pumped for 135 minutes at an average rate of 90 gpm and the water discharged 250 feet distant to a natural drainageway. Measurements were made of the recovery of water levels for 145 minutes. At the end of the pumping phase the water level lowered 10.22 feet (95.57 feet below land surface), indicating a specific capacity of 9 gpm per foot of drawdown, a high value. The recovery of the water level plotted according to the Theis nonequilibrium formula did not indicate any recharge or discharge boundaries for the short period of the test. The computed coefficient of transmissibility was 24,000 gpd per ft., a value which compares favorably with those obtained in the Baltimore area (Bennett and Meyer, 1952) for the Patuxent and Patapsco formations.

The test indicates that the hydrologic properties of the aquifer are such that substantial quantities of ground water can be obtained from properly screened and developed wells in the Patapsco formation at the test locality.

Raritan Formation

Distribution and Lithology

The Raritan formation is present at the surface in Cecil County (Pl. 4) as the capping of hills on Elk Neck and as a belt 1½ to 2 miles wide that extends southwestward from the Delaware line near Back Creek to the mouth of the Elk River. It reappears in Kent County near Howell Point at the mouth of the Sassafras River, and continues along the shore of the Bay to Worton Point.

The rocks of the Raritan formation are, in general, similar to those of the Patapsco. They consist mainly of fine to medium-grained sand, but contain also clay, sandy clay, and a few indurated pebble beds. The clays are less highly colored than the clays of the Patapsco and the proportion of sand is greater.

The following section of the upper part of the Raritan formation is exposed in the bluffs along the south side of the Sassafras River near Betterton:

Section of Upper Part of the Raritan Formation East of Betterton on the Sassafras River

Description	Thickness (feet
Concealed (chiefly Pleistocene deposits)	68.0
Sand, coarse, white with yellowish orange streaks	3.0
Clay, somewhat sandy, very pale orange	1.3
Sand, coarse, sugary, reddish and yellowish orange	2.0
Sand, heavily iron-stained	0.3
Sand, coarse, iron-stained, red and yellowish orange, cross-bedded	0.5
Sand, very coarse, gray	1.0
Clay, sandy, very pale orange	0.2
Sand, poorly sorted, very coarse to fine, irregular bedding, dark streaks	1.5
Concealed to water level	3.0
Total	80.8

The section shows the heterogeneity of the material in the Raritan formation. Only a short distance along the beach this section is replaced by a thick bed of coarse-grained, clean, white and weak-yellowish orange sand. Such marked lateral variation in the character of the material within a short distance is frequent in the Raritan formation.

A section of the Raritan formation in the log of well Ken-Ac 4 (Table 49) near Meeks Point on Still Pond Neck shows 62 percent sand and 38 percent clay and sand. None of the sands above the lowermost sand yielded sufficient water to make a productive well. This may be because the well lies close to the edge of a high bay bluff, and those sands are well drained.

The Raritan formation shown in the log of the Chestertown well (Ken-Cd 3) is of special interest as it was encountered there at a depth of 344 feet (Table 49). The well is about 9 miles southeast of the outcrop of the formation. The log shows much red clay and in that way differs from logs of most of the wells drilled on or near the outcrop of the formation. The log shows, too, that sand is chiefly in the bottom part of the formation. In wells at Crystal Beach, by contrast, the water sands lie near the top of the formation. If the lithology found in the Chestertown well prevails down the dip to the southeast or along the strike of the formation to the southwest and northeast, it might be necessary to drill through 200 feet of clay before reaching a water sand in the formation. It is probable, however, that the clay does not persist.

The deposits of the Raritan were derived in part from Precambrian crystalline rocks and from sediments of Paleozoic age, and in part from the reworking of material from the deposits of the Patuxent and Patapsco. The deposits are continental in origin and were laid down under conditions somewhat similar to those of the Patapsco formation.

In outcrop the separation between the Raritan formation and the overlying Magothy formation is easy as they are distinctly different in character and appearance. The Magothy formation consists characteristically of white, sugary quartz sand, and of very dark gray, carbonaceous, sticky clay. Difficulty arises, however, in deciding from the drillers' logs whether a reported white sand is the base of the Magothy or the top of the Raritan formation.

Table 22 shows the relative amounts of the different types of sediments in wells penetrating the Raritan formation. The data indicate that the Raritan is sandier than the underlying Patapsco formation. For the area as a whole it contains 49 percent sand and gravel in contrast to only 19 percent in the Patapsco formation. However, the proportion of sand reported as water-bearing is somewhat higher in the Patapsco than in the Raritan formation (9 percent and 6 percent respectively). The Crystal Beach Manor-West View Shores locality, represented by 24 wells, has the highest proportion of sand and gravel, 49 percent. The use of 24 wells from this area in Table 22 weights the table geographically.

Structure

The Raritan formation strikes about N 50° E and has a southeastward homoclinal dip of about 30 feet to the mile.

Thickness

A maximum thickness of 200 feet is assigned to the Raritan formation in Cecil County (Bascom and Miller, p. 10). In the deep well at Chestertown it is 237 feet thick. Drillers' logs are of little help in determining the thickness of the formation. In drillers' logs in northern Kent County the base of the Raritan formation is arbitrarily placed about 200 feet below the contact with the Magothy formation. The formation thins toward its outcrop and thickens down the dip. Near Chesapeake City its thickness is about 100 feet, and at Queen Anne about 500 feet.

TABLE 22

Thickness, in Feet, of Sediments in Wells penetrating the Raritan Formation

(data from drillers' logs)

Area or Locality	Number of wells	Clay	Sand and gravel	Sandy clay and clay and sand	Total formation penetrated	Thickness of water sand
Chesapeake City-Hack Point	10	58	45	27	130	15
Percent	—	44	35	21	100	12
Crystal Beach Manor-West View Shores	24	111	296	197	604	9
Percent	—	18	49	33	100	1+
Howell Point-Betterton	10	29	86	72	187	15
Percent	—	15	46	39	100	8
Rock Hall	1	0	56	2	58	19
Percent	—	0	97	3	100	33
All areas	45	198	483	298	979	58
Percent	—	20	49	31	100	6

Depth of Wells

The depth of wells that tap the Raritan formation varies according to their locality—in the Chesapeake Beach area they range in depth from 51 to 140 feet; in the Hack Point area from 90 to 200 feet. At Chestertown the Raritan was penetrated at a depth of 344 feet.

Water-bearing Properties

The Raritan formation is lithologically and hydrologically similar to the Patapsco formation. The water-bearing beds are lenses of medium- or coarse-grained sand that are separated by clay, but may be connected hydrologically through intervening beds of clayey sand or sandy clay. The lenticularity of the sands is indicated by the different depths at which water is found in neighboring wells. At Crystal Beach 17 wells were inventoried within an area of less than one-half square mile. The bottoms of the wells range between 16 and 90 feet below sea level, though the bottoms of most of the wells are between 25 and 74 feet below sea level. The depths of wells at Hack Point, within an area comparable in size to that at Crystal Beach, range between 66 and 190 feet below sea level.

Table 23 shows the average yields and specific capacities of wells tapping the Raritan formation. The yields range from 7 to 300 gpm and average 35 gpm. Specific capacities range from 0.3 to 7.1 gpm per ft. of drawdown and average 1.3 gpm per ft. As 43 of the wells are domestic wells at Crystal Beach, the averages are definitely weighted in favor of this locality and for domestic wells.

Well Ce-Cf 5, about a mile east of Chesapeake City, yielded 300 gpm when drilled in 1952 and is the best well in the Raritan formation. It is 8 inches in diameter and is screened from 125 to 150 feet opposite a clean brown and white sand 28 feet thick. The specific capacity of the well in September 1952 was

TABLE 23

Yields and Specific Capacities of Wells in the Raritan Formation

Area	Number of wells	Average yield (gpm)	Number of wells	Average specific capacity (gpm/ft.)
Crystal Beach (Cecil County)	43	29	42	1.2
Hack Point (Cecil County)	8	25	8	1.2
Howell Point (Kent County)	9	27½	8	1.6
All areas	71	35	69	1.3

7.1 gpm per ft., the highest value for any well tapping the Raritan. Well Ken-Db 35 drilled for the town of Rock Hall yielded 105 gpm. This well is 8 inches in diameter and is screened with no. 16 and no. 12 slot brass opposite a sand at a depth of 271 to 290 feet. Its specific capacity was 1.1 gpm per ft. when tested in September 1953.

The lower average yields of wells in the three localities in Table 23, Crystal Beach, Hack Point, and Howell Point, reflect the predominance of 4- and 6-inch diameter domestic wells. The small yields required for a domestic supply do not necessarily indicate the maximum available from the aquifer.

Magothy Formation

Distribution and Lithology

In Cecil County the Magothy formation crops out along a 2-mile band, extending from the Chesapeake and Delaware Canal along Elk River to Grove Point on the Sassafras River. In Kent County it extends along the Bay shore from Sassafras River to a point about 3 miles south of the mouth of Fairlee

Creek (Pl. 4). The best exposures of the formation are at Bethel on the Canal and in the cliffs west of Betterton. The formation has, on outcrop, a characteristic appearance. It consists typically of black or dark brownish-gray, sticky, thinly laminated clay that contains much woody matter, pyrite, and marcasite, and of finely banded, rather poorly sorted (fine to granular) white sand. Because of the sharpness of the angles on the sand grains, the sands are usually described as "sugary".

Carter (1937, p. 248) noted three divisions of the formation:

Geologic Section of the Magothy Formation along the Chesapeake and Delaware Canal

Description	Thickness (feet)
Black and blue-black sticky clay; many plant remains; siderite nodules	15
White sand and clay; sand coarse, sharp, sugary; little mica	18
Fine, yellow, iron-stained, micaceous sand, and some lenses of black sticky clay	25
Total	58

In the cliff at Betterton part of the Magothy formation is as follows:

Magothy Formation in the Cliff near Betterton

Description	Thickness (feet)
Iron-cemented sand and gravel bed (Wicomico formation)	0.1
Clay, light brownish-gray, sticky	2.5
Sand, granular, chiefly white vein quartz	.1
Clay, gray, somewhat sandy	1.7
Clay streaks, black and gray, thinly laminated	1.0
Clay, gray, very sandy	1.8
Clay, dark gray	6
(Base of section at sea level)	
Total	13.2

The water-bearing sand in the Magothy formation in the deep well at Chestertown (Ken-Cd 3) consists of 7 feet of coarse white sand separated by a 5-foot bed of soft lead-colored clay.

Table 24 shows the grade size of the material comprising the Magothy formation in Cecil and Kent Counties. In Queen Annes County only two wells penetrate the formation.

A detailed mechanical analysis and mineral description of sediments from the Magothy formation at Betterton is given by Goldman (1916, p. 120–124) who describes the poor sorting of the sand grains in both the sand and the sandy clay. Heavy minerals are abundant in the sand and of these minerals worn glauconite grains are dominant. Neither the deposits of the Magothy nor the deposits immediately preceding them are of marine origin. The Magothy formation probably marks the beginnings of a marine invasion which, though not extensive in Magothy time, culminated in the deposits of later age. In New Jersey, at Cliffwood, the Magothy contains a marine fauna. The glauconite in the deposits at Betterton may be eroded material from marine incursions that occurred in Maryland, of which other traces have been largely destroyed.

The deposits of the Magothy were probably laid down in estuaries and on the low-lying plains around the estuaries or along the sea coast. The abundance of lignitic material and the presence of siderite indicate swampy terrain; the absence of coarse sandy material indicates deposition in low-lying plains or

TABLE 24

Thickness, in Feet, of Sediments in Wells penetrating the Magothy Formation

(data from drillers' logs)

Area or Locality	Clay	Sand and gravel	Sandy clay and clay and sand	Total formation penetrated	Thickness of water sand
Cecil County	291	424	167	882	9
Percent	33	48	19	100	1
Kent County	610	380	161	1,151	11
Percent	53	33	14	100	1
Both counties	901	804	328	2,033	20
Percent	44	40	16	100	1

estuary bottoms; the angularity of the quartz grains indicates slight water transportation. The lack of continuity in the sedimentary types and of marine faunas are against a marine origin, but the finding of marine faunas in New Jersey suggests nearness to the sea.

The Magothy formation is separated by unconformities from the underlying Raritan formation and the overlying Matawan formation. Although in outcrops the Magothy is easily recognized, it is much harder to pick the contact between it and the adjacent formations in drillers' logs or even in sample logs. The overlying Matawan formation contains near its base black lignitic clays similar to those in the Magothy; and the Raritan formation contains near its top white sugary sands like those in the Magothy. The black clays are lumped together as a unit and the white sands as a unit in well drillers' logs. In Tables 48 and 49 the contacts are, therefore, based somewhat arbitrarily on a consideration of thickness, general geologic position, and the quality of water obtained from the unit.

Structure

The Magothy formation has an average strike of N 52° E and a homoclinal dip toward the southeast of about 30 feet to the mile (fig. 4 and Pl. 6).

Thickness

The thickness of the Magothy formation varies somewhat, as the deposits were laid down on an irregular surface and were later partly eroded. Borings in Delaware for the foundation of the St. George's bridge across the Chesapeake and Delaware Canal show that, at places, the deposits are discontinuous. This condition may explain the apparent absence of the Magothy formation in many drillers' logs as in the log of well Ce-Df 1.

Drillers' logs indicate a thickness of the Magothy of about 33 feet in Cecil County and about 40 feet in western Kent County. At Chestertown it is 76 feet thick, and on the Canal, according to Carter, it is 58 feet thick. An average thickness of 60 feet was used for the construction of the profile sections. The reported thickness of the water-bearing sand in it is about 10 feet.

Depth of Wells

The depths of wells yielding water from the Magothy range from 58 feet at Hack Point to 259 feet at Cecilton, the shallow wells being near the outcrop and the deep wells down dip. Plate 6 indicates the position below sea level of the top of the formation. Land surface elevation must be added to the values of the contours to obtain the depth of the well.

Water-bearing Properties

The Magothy formation is the oldest of the formations which have a fairly broad lateral distribution of homogeneous material. It also contains the first extensive aquiclude. It consists of two very different types of material—a fairly coarse angular sand that is permeable and a sticky carbonaceous clay of low permeability. In most places the sticky clay is at the top of the formation, in others it is at the base. When at the top it may be lithologically continuous with the sandy clays of the overlying Matawan formation; if at the bottom the clay may be contiguous with the clays in the underlying Raritan formation.

It is likely that the basal sand in the Magothy is hydrologically connected with the Raritan formation. Thus along the cliffs west of Betterton it is not possible to pick the contact between the two formations.

Table 25 shows the yield of 48 wells in the Magothy formation ranges from 7 to 85 gpm and averages about 30 gpm. Specific capacities of 42 wells range from 0.3 to 6.3 gpm per ft. of drawdown and average 1.4 gpm per ft. These values differ only slightly from those of the underlying Raritan formation.

The values are weighted in favor of the Grove Point and Betterton areas where 60 per cent of the Magothy wells are located. As most of the wells in Table 25 are domestic wells, the yields and specific capacities given are not necessarily indicative of the maximum obtainable. Well Ken-Db 2 at Rock Hall had the maximum reported yield. It was drilled in 1946, was 6 inches in diameter and yielded 85 gpm from a gray sand at a depth of 190 to 202 feet. The well had a specific capacity of 1.6 gpm per ft. It was subsequently abandoned because of the unsatisfactory chemical quality of the water. A well yielding moderate supplies from the formation was drilled in 1953 for the town of Cecilton. This well, Ce-Ee 11, 6 inches in diameter and 274 feet deep, yielded 75 gpm with a specific capacity of 2.1 gpm/ft. of drawdown. Other wells of moderate yield supply hotels and cottages. They have 4-inch casings and are reported to yield

TABLE 25

Yields and Specific Capacities of Wells in the Magothy Formation

Area	Yields			Specific capacities		
	Number of wells	Range (gpm)	Average (gpm)	Number of wells	Range (gpm/ft.)	Average (gpm/ft.)
Grove Point (Cecil County)	10	7.5–45	25	9	0.4–2.9	1.0
Betterton (Kent County)	19	8–70	32	16	0.5–6.3	1.6
All areas	48	7–85	30	42	0.3–6.3	1.4

40–50 gpm (Ken-Ad 5, -Ad 8, -Ad 11). Yields of this magnitude from 4-inch wells indicate a moderately high efficiency.

The Magothy is an important water-bearing formation in the area, but the fact that it appears to be closely connected hydrologically with the adjacent formations makes its separation somewhat academic. It has been passed by as an aquifer in many wells drilled through it.

Hydrologic coefficients

Cecilton test.—At Cecilton, the top of the water-bearing sand in the Magothy formation lies about 185 feet below sea level. The aquifer has a thickness of over 25 feet and has been tapped by a few wells of small diameter.

On September 17–18, 1956, the aquifer was tested, using the municipal fire company 6-inch diameter well (Ce-Ee 11) as the pumped well and a privately-owned 4-inch diameter well (-Ee 28) as the observation well. The wells are 337 feet apart. Well -Ee 11 is 274 feet deep and well -Ee 28 is 289 feet deep.

Well Ce-Ee 11 was pumped at an average rate of 128 gpm and had a reported specific capacity of 15 gpm per ft., based on a prior 16-hour test. For this test a piezometer tube and orifice were used to measure its discharge. The pumped water was removed via the town sewage system. The drawdown phase of the test lasted 360 minutes and the recovery phase 180 minutes. Before pumping began the depth to water from the land surface was 66.47 feet, and at the end of the drawdown period the depth to water was 69.46 feet, or a drawdown of only 2.99 feet. The plot of the drawdown and recovery of the water levels fits the Theis nonequilibrium type-curve very well and the modified Theis straight-line plot did not disclose any recharge or discharge boundaries, at least for the duration of the test. The average coefficients of transmissibility and storage were 25,000 gpd per ft. and 0.0001, respectively.

The aquifer test indicates that moderately large pumping from sands in the Magothy formation is possible in the Cecilton area.

Matawan Formation

Distribution and Lithology

The Matawan formation is the oldest of the marine Upper Cretaceous formations of Maryland. It crops out along a 1- to 2- mile wide belt, which extends from the Delaware state line near Chesapeake City southwestward across Cecil County and Kent County to the Chesapeake Bay a few miles north of Rock Hall (Pl. 4). The best exposures of the formation are in Delaware along the Chesapeake and Delaware Canal. In Kent County fair exposures of part of the formation lie on the south shore of the Sassafras River east of the mouth of Lloyd Creek. The contact between the Magothy and the Matawan formations is exposed at the west end of Grove Point in Cecil County. The Matawan formation is penetrated by many drilled wells in both Cecil and Kent Counties.

The formation differs in lithology from the older Cretaceous formations. It is characteristically a dark gray, micaceous, glauconitic, silty or clayey sand. The strata commonly vary from light-colored iron-stained sand to very dark carbonaceous clay. Marine fossils are rare. Abundant mica and glauconite aid in its recognition in well samples. Goldman (p. 132–158) gives a detailed mechanical analysis and mineralogical description of samples from the Matawan formation in Kent County. He found both reworked glauconite and fresh glauconite.

The Matawan formation has been subivided into a number of members in New Jersey, and attempts have been made to correlate beds exposed along the Chesapeake and Delaware Canal with the type members (Carter, p. 250–261). Exposures in Maryland are too poor, however, to allow correlation with New Jersey or even Delaware sections.

A section of the upper part of the Matawan formation exposed along the bluffs on the Sassafras River, east of the mouth of Lloyd Creek, was described by Miller (1926, p. 66). A more detailed description of the section, made by the author in 1950, follows:

Geologic Section of Part of the Matawan Formation at Lloyd Creek, Kent County

Description	Thickness (feet)
Sand, dark yellowish orange, greatly iron-stained and in part iron-cemented; sand, medium-fine, containing about 15 per cent light green glauconite, small Halymenites-like tubes which are slightly iron-cemented and etched out by wind. Quartz grains clear, but iron-stained. Iron carbonate, chief cementing material	11
Sand, medium-fine grained, dark yellowish orange. Glauconite, light yellow-brown, about 15 percent of sand; mica fairly common	7.5
Sand, iron-stained, yellow-gray	1
Sand, light brownish gray, very argillaceous; glauconite, 15 per cent; mica fairly common	2
(Base at sea level)	
Total	21.5

The section shows the upper portion of the Matawan formation is sandy and high in iron. No fossil shells were found but they may have been leached away.

The log of the deep well at Chestertown (Ken-Cd 3) contains a description of the Matawan formation. The 30-foot water-bearing sand in this well may correspond with the sand at the top of the formation in the Lloyd Creek exposure. At Hack Point a black sandy clay crops out which lies just above the Magothy formation. Further descriptions of the lithology are found in Table 46, in logs of wells Ken-Bd 2 and Ken-Db 1.

In drillers' logs the positive identification of the Matawan formation is difficult. It is lithologically similar to the overlying Monmouth formation and it contains dark gray and black carbonaceous clay which has the general appearance of the underlying Magothy clay. Where samples are available the clays can be differentiated, because the clay of the Matawan contains glauconite and the clay of the Magothy generally does not.

The marine origin of the Matawan deposits is indicated by the presence of glauconite and of a marine fauna. The rather large amount of mica in the sand and clay point to crystalline rocks as a partial source of the material. The abundance of carbonaceous matter suggests near shore or lagoonal conditions at times during the deposition of the formation. Table 26 shows the formation averages of 27 percent sand, 45 percent sandy clay, and 28 percent clay.

Structure

The Matawan formation strikes about N 48° E and dips about 25 feet to the mile to the southeast (Pl. 4 and fig. 5).

Thickness

The thickness of the Matawan formation, as given by Bascom and Miller, averages about 65 feet. The log of the Chestertown well (Ken-Cd 3) shows a thickness of 68 feet, and the drillers' logs show about 50 feet.

TABLE 26

Thickness, in Feet, of Sediments in Wells penetrating the Matawan Formation

(data from drillers' logs)

Area	Clay	Sand	Sandy clay	Thickness
Cecil County				
Crystal Beach Manor	60	16	0	76
Hack Point	0	0	53	53
Bohemia Mills	30	0	25	55
Total	90	16	78	184
Percent (average)	49	9	42	100
Kent County				
Betterton	28	114	63	205
Kentmore Park	0	10	44	54
Tolchester	20	0	42	62
Total	48	124	149	321
Percent (average)	15	39	46	100
Total (both counties)	138	140	227	505
Percent (average)	28	27	45	100

Depth of Wells

The depth to which wells must be drilled to obtain water from the Matawan formation varies with the topography and the location. Southeast from its outcrop area the formation is encountered at progressively greater depths, which range from about 50 to more than 200 feet.

Water-bearing Properties

The Matawan formation differs lithologically and hydrologically from the underlying formations of continental origin. Whereas the most permeable water-yielding beds of the continental deposits are lenticular, those of the Matawan and other overlying marine deposits are sheetlike. The Matawan consists of an upper sand and a lower sandy clay and clay. It appears to be somewhat more sandy in the Betterton area than in other areas. The sand, as exposed in outcrop in the bluffs at the mouth of Lloyd Creek, is medium- to fine-grained, and at places is iron-cemented. Goldman's histograms (p. 169) of three sand samples from outcrops of the Matawan formation show the sand to be rather poorly sorted and to be medium- to fine-grained.

The average thickness of the water-bearing zones in the formation ranges from 5 to 10 feet, based on drillers' logs. The sandy beds at the top of the Matawan formation, which are in contact with the Monmouth formation, probably are hydrologically connected with the basal beds of the overlying unit.

Yields and specific capacities are available for 8 wells in Kent County and 4 in Cecil County. The yields range from 7.5 to 180 gpm and average 37.5 gpm. The average is weighted somewhat by the comparatively large yield of well Ken-Db 1 at Rock Hall. This well, a 6-inch diameter well completed in 1946, yielded 180 gpm with a specific capacity of 9.5 gpm per ft. The specific capacities range from 0.2 to 9.5 gpm per ft. and average 1.5 gpm per ft. The average yields and specific capacities of these wells in the Matawan are similar to those of the underlying Magothy formation.

Hydrologic coefficients

An aquifer test was made at Rock Hall on a sand believed to be a part of both the Matawan and the overlying Monmouth formation. The coefficients obtained from this test are given in the discussion of the water-bearing properties of the Monmouth formation.

Monmouth Formation

Distribution and Lithology

Beneath the Pliocene(?) and Pleistocene deposits in Cecil and Kent Counties, the Monmouth formation extends along a wide belt from the Delaware state line nearly to Rock Hall (Pl. 4). The best exposures of the formation are in Delaware along the Chesapeake and Delaware Canal (Carter, p. 261–269 and Spangler and Peterson, 1950, p. 46–49). The best exposure in the tricounty area is on the Sassafras River east of the mouth of Lloyd Creek.

The Monmouth formation is similar in appearance to the underlying Matawan formation. In outcrop along the Canal and elsewhere it is characterized by a reddish brown color, a fairly high glauconite content, and by argillaceous sand or sandy clay. The basal member of the formation is a dark, micaceous and glauconitic, silty sand that, at places, contains fossils and many siderite concretions. This member is exposed in the bluffs at Lloyd Creek in Kent County, but is unfossiliferous there. That the sand beds are not continuous over a wide extent is shown by the lack of uniformity in well logs. The sand is generally fine-grained, and, where coarse, is poorly sorted (Goldman, p. 169).

A composite section along the Sassafras River between Turner Creek and Kentmore Park in Kent County is:

Geologic Section of the Lower Part of Monmouth Formation along the Sassafras River

Description	Thickness (feet)
Wicomico formation:	
Loam; a little gravel	4
Sand, coarse, cross-bedded	8
Gravel, coarse	.5
Monmouth formation:	
Sand, moderate yellowish brown, argillaceous	15
Sandy clay, pale brown	1
Sand, coarse, weak brown, granules abundant in upper part; glauconite; sand is mottled with grayish blobs	6
Sand, slightly argillaceous, moderate yellowish brown, coarse; glauconite, grains chiefly smooth, round, iridescent; quartz grains, iron-stained; silt light gray	5
Greensand, moderate brown; glauconite, very greatly oxidized; nodules suggesting leached fossils; contorted bands of iron crust	3
(Base at sea level)	—
Total	42.5

At Bohemia Mills in southeast Cecil County exposures consist of yellowish brown, iron-stained, medium-coarse sand. Glauconite in the sand is dull gray-green, not botryoidal, and finer grained than the quartz.

The Monmouth formation is described in the log of the deep well at Chestertown (Ken-Cd 3), where it is 71 feet thick and consists of green and black marl and dark brown sand. The log of well Ken-Ae 3 at Glencoe (Table 49) shows that 81 feet of the formation consists chiefly of brown, red, and white sand and some dark gray and white clay. The basal 14 feet consists of fine water-bearing sand. The Monmouth formation differs from the Matawan in being more arenaceous. It is not, in general, micaceous, and it contains little black clay. The overlying Aquia greensand is somewhat similar in appearance, but the Aquia is more glauconitic. Further descriptions of the lithology of the formation are given in Tables 48 and 49 (wells Ken-Db 1, -Db 2, and -Db 34).

No wells in the southern part of Queen Annes County have been drilled deep enough to reach the top of the Monmouth formation. Logs from wells in Talbot and Caroline Counties show that the formation there consists of silty clay and is not water-bearing. Apparently the Monmouth formation does not yield water to wells in the south and southeast part of Queen Annes County.

The Monmouth formation is of marine—probably, in part, estuarine—origin. Although the formation is sandy, it is also argillaceous. The large amount of sideritic iron in it suggests rather shallow-water or swampy deposition. The coarse sands exposed in the Sassafras River bluffs indicate the action of fairly strong currents at some places at times.

Structure

The Monmouth formation strikes northeast and dips about 25 feet to the mile to the southeast (Pl. 7 and fig. 5).

Thickness

In Cecil County the thickness of the Monmouth formation (Bascom and Miller, 1920, p. 10) is between 80 and 100 feet. The outcrop map (Pl. 4) suggests a thinning of the formation toward the southwest. In well Ken-Cd 3 at Chestertown it is 71 feet thick. Drillers' logs indicate an average thickness of 54 feet. In the deep well (Tal-Cb 89) at Wades Point, Talbot County, it is reported by Rasmussen and Slaughter (1956, p. 317) to be 93 feet thick.

Depth of Wells

The depths of wells tapping the Monmouth formation range from about 50 feet in northern Kent County to 490 feet near Starr in southern Queen Annes County.

Water-bearing Properties

The Monmouth formation is a good aquifer throughout most of Kent and Queen Annes Counties, except in the southeast part of Queen Annes County where it is probably an aquiclude (Rasmussen and Slaughter, 1956, p. 3).

The best wells tapping the Monmouth formation are QA-De 27 and -De 28 at Centreville, which yield 750 and 500 gpm, respectively. Well -De 27 is 10 inches in diameter and was drilled in 1899. It is screened opposite a sand at a depth of 360 to 390 feet, and had a specific capacity of 23.4 gpm per ft. in 1955. Well -De 28, an 8-inch well apparently screened opposite the same sand, had a specific capacity of 19.4 gpm per ft. in 1915.

The yields of 25 other wells tapping the Monmouth formation range from 7.5 to 200 gpm and average 40 gpm. Thus, the average yield of wells tapping the Monmouth formation is somewhat above the average for the underlying Magothy and Matawan formations, 37.5 and 30 gpm, respectively. Specific capacities of these wells range from 0.2 to 8.0 gpm per ft. and average 1.8 gpm per ft. The best well in the Monmouth formation, exclusive of the Centreville wells, is Ken-Bg 26 at Massey. This well is 8 inches in diameter, contains 15 feet of screen from 177 to 192 feet, and had a specific capacity of 4.3 gpm per ft. in 1952.

Hydrologic coefficients

Rock Hall test.—At Rock Hall water is produced from sands of the Matawan and Monmouth formations which apparently act as a single hydrologic unit. Logs of wells in the area show variations in thickness of these sands. The Rock Hall area is in the sub-outcrop zone of the Monmouth formation. The formation is covered by a veneer of Pleistocene deposits. The log of well Ken-Db 35 shows that the Matawan and Monmouth formations consist of 77 feet of gray and white sand with some green clay from a depth of 87 to 164 feet.

On June 25 and 26, 1952, an aquifer test was conducted at the Kent Packing Company plant by pumping well Ken-Db 3, an 8-inch diameter well, 128 feet deep. Well Ken-Db 36, 106 feet deep and 52 feet from -Db 3, was the observation well and was equipped with a water-stage recorder. The top of the Monmouth formation is at a depth of 60 feet and the producing sand in it is at 98 feet. The sand was penetrated to a depth of 29 feet. The nearest producing wells were the town supply wells 2,200 feet distant. Due to the need for water, it was not possible to control the pumpage of those wells prior to or during the test. However, the effect of the town pumping on the water level at the Kent Packing Company well was so insignificant that a correction factor was unnecessary.

During the drawdown phase, well Ken-Db 3 was pumped for 9 hours at an average rate of 156 gpm. The discharge was measured by an orifice and piezometer tube, the water being wasted to an open ditch. Drawdown in well Ken-Db 36 at the end of pumping was 23.28 feet. The recovery phase of the test lasted 23¼ hours. Coefficients of transmissibility and storage were calculated to be about 5,000 gpd per ft. and 0.0003, respectively.

As the sub-outcrop belt of the Matawan and Monmouth formations immediately west and northwest of Rock Hall is covered by bottom sediments of the Chesapeake Bay, salt-water encroachment in the formations could occur if the draft on the aquifer became large (on the order of a million gallons or more per day). Continued large-scale pumping would deepen and enlarge the cone of depression and thus lower the artesian head in the aquifers below the level of the saline Chesapeake Bay. If the Bay bottom sediments are thin and permeable, a condition could be created which would permit the saline water to move down into the formations. With only relatively small pumping from the Matawan and Monmouth formations in the Rock Hall area, no salt-water encroachment is known to have occurred. Periodic checks on the chloride content of water from the wells should be made in order to note any increase in chloride which would warn of encroachment.

Kennedyville test.—An aquifer test of the Monmouth formation was conducted on September 24 and 25, 1956, at the F. O. Mitchell packing plant. Well Ken-Be 30 was utilized as the pumping well and -Be 34 as the observation well. The wells are spaced 11½ feet apart. Both are reported to contain screens. Well -Be 30 is 6 inches in diameter and 190 feet deep; well -Be 34 is 3 inches in diameter and 169½ feet deep. Well logs are not available.

Well Ken-Be 30 was kept inoperative for four days before the test began in order to stabilize the static water level in the locality. It was pumped for 1,440 minutes at an average rate of 123 gpm, the discharge rate being measured by a piezometer tube and orifice. The discharged water was removed via the plant sewage system. The water level in -Be 30 declined from 24.88 feet to 75.38 feet below the land surface, a drawdown of 50.50 feet. Recovery measurements of the water level in observation well -Be 34 were made for 540 minutes. For a period of 26 minutes of drawdown and 200 minutes of recovery, the water levels plotted according to the Theis nonequilibrium and modified nonequilibrium formulas indicate an average coefficient of transmissibility of 2,200 gpd per foot and a coefficient of storage of 0.0012. There is the possibility that the screens of the two wells are farther apart vertically than horizontally, a condition that would have affected the derived coefficients considerably.

A plot of the water levels from 200 to 700 minutes using the nonequilibrium straight-line drawndown method gave a curved line in a recharge (upward) direction. From 700 to 1,440 minutes the water levels plotted as a straight line, giving a coefficient of transmissibility of 4,900 gpd per foot and a coefficient of storage of 0.0000003. The apparent recharge to the aquifer may be caused by leakage from higher, less permeable sediments, or it may be the boundary effect on the water levels of changes in thickness and permeability of the aquifer.

A practical application of the use of coefficients of transmissibility and storage as determined by aquifer tests like that at Kennedyville is illustrated by the following: assuming that another well were drilled to the same aquifer 500 feet distant from well Ken-Be 30, and that -Be 30 were pumped at a rate of 100 gpm continuously for 90 days, calculations using aquifer coefficients of 2,200 and 0.0012 show a lowering of the water level of approximately 30 feet would occur in the new well even before pumping began in it.

On the assumption the coefficients computed for the period from 26 to 200 minutes are a true representation of the hydrologic properties of the producing sands, the potential withdrawal of ground water from the Monmouth formation at Kennedyville is limited. Farther downdip the Monmouth formation may change in character and yield more water to wells. There is, however, in Caroline, Dorchester, and Talbot Counties no direct evidence to substantiate such an improvement in the water-bearing properties of the formation (Rasmussen and Slaughter, 1956, p. 53–54).

Massey test.—On November 28, 1955, an aquifer test was run on a sand in the Monmouth formation at the plant of the Massey Packing Company. Sample cuttings from observation wells Ken-Bg 27 and -Bg 28, drilled to 205 and 250 feet, respectively, show the water-bearing sand in the formation is from 32 to 44 feet thick. The top of the sand lies 172 to 173 feet below the land surface. A layer of clay, fine sand, and shell, 27 to 36 feet thick, overlies the sand and separates it from a zone in the Aquia greensand which is also water-bearing.

Well Ken-Bg 26 was drilled in 1952 to a depth of 197.5 feet. It contains 8-inch casing and a screen from 177 to 192 feet. The well was reported to produce 225 gpm with a specific capacity of 5 gpm per foot of drawdown. It is the only well producing from the Monmouth formation in the Massey area. It was reported not to have been used for over a year prior to the test. Shortly before the test, the well was pumped for brief intervals in order to determine piezometer-tube and orifice sizes needed to measure the discharge rate.

Observation wells Ken-Bg 27 and -Bg 28 are 324 and 103 feet, respectively, from and in alignment with pumping well -Bg 26. During the test they were equipped with water-stage recorders. The drawdown and recovery phases lasted 265 minutes each. The pumpage from well Ken-Bg 26 averaged 194 gpm. The water was discharged to an open ditch. As the water ponded in the vicinity of the test and observation wells, pumping had to be stopped approximately 4½ hours after it was begun.

Based on the data from Ken-Bg 27 the average coefficients of transmissibility and storage (drawdown and recovery) were 6,200 gpd per foot and 0.0002, respectively. From well -Bg 28, they were 5,500 gpd per foot and 0.0002, respectively. Analysis by the Thiem equilibrium formula (drawdown and recovery) gave average coefficients of transmissibility and storage of 5,000 gpd per foot and 0.0002, respectively. An overall average coefficient of transmissibility is about 5,500 gpd per foot and of storage about 0.0002.

At the end of 265 minutes of pumping water levels had fallen 10.38 feet and 20.56 feet in wells Ken-Bg 27 and -Bg 28, respectively. On the basis of the hydrologic coefficients obtained, assuming no nearby recharge or discharge boundaries and that the aquifer is infinite in extent and constant in thickness, after continuous pumping for 1 year at 194 gpm, the theoretical drawdown in well Ken-Bg 27 would be about 35.5 feet. However, as the existing information shows that the sands of the Monmouth formation are not continuous, it can be assumed that hydrologic boundaries exist in the Massey area, which further limits the ultimate water-yielding capacity of the aquifers.

The available test data indicate that long-continued pumping from wells tapping the Monmouth formation in the Massey area will cause a substantial decline in artesian head in the vicinity of the discharging wells.

TERTIARY SYSTEM

PALEOCENE SERIES

Brightseat Formation

The Brightseat formation has not been recognized in the tricounty area. That the formation may occur in the subsurface in the southeast part of the area is indicated by the presence of material tentatively identified as the Brightseat in well Tal-Cb 89 at Wades Point, Talbot County, at depths of 536 to

596 feet. There it is 60 feet thick and consists of an upper sand, 26 feet thick, and a lower clay, 34 feet thick. It is doubtful, however, that it extends far to the north of Stevensville or Grasonville. Figure 6 shows the position of the Brightseat in relation to the underlying and overlying formations. In Caroline,

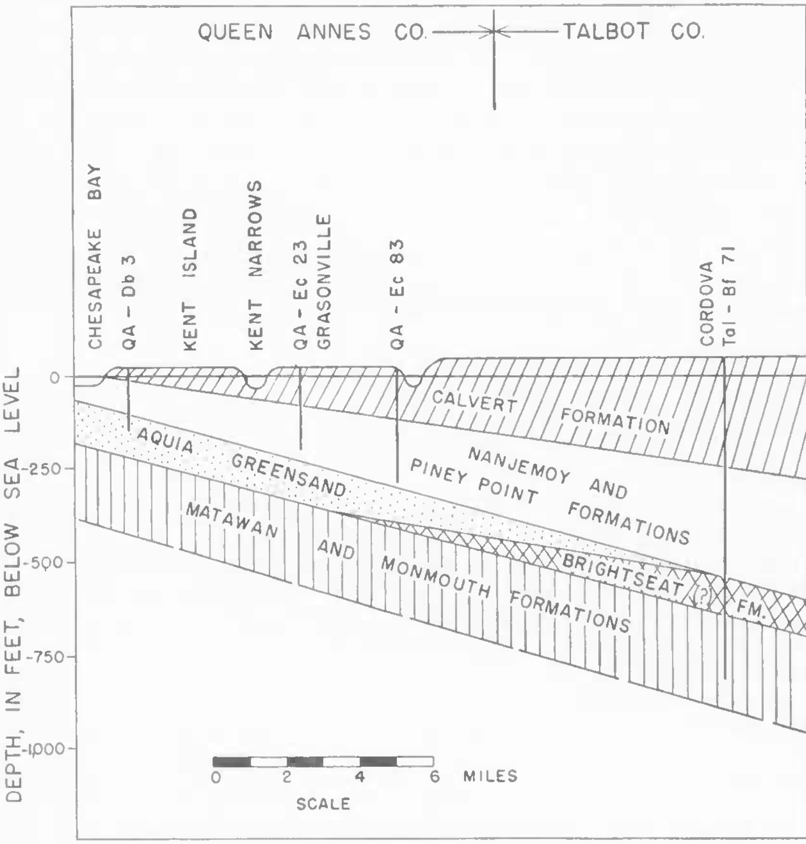

FIGURE 6. Geologic Profile from Kent Island to Cordova (line C–C′ on Plate 4)

Dorchester, and Talbot Counties the Brightseat formation is reported to be mainly an aquiclude (Rasmussen and Slaughter, 1956, p. 55).

EOCENE SERIES

Aquia Greensand

Distribution and Lithology

The Aquia greensand is the only Eocene formation known to be exposed in the tricounty area. Beneath the surficial deposits it occurs in a belt, 5 to 8 miles wide, extending from the Delaware line at the Sassafras River to Langford Bay (Pl. 4). Exposures are found in low bluffs along the Sassafras River west to Georgetown and along the Chester River south of Chestertown.

The Aquia greensand is of marine origin. From the evidence furnished by the lithology and the Foraminifera, Shifflett (p. 42) concluded it was probably deposited in fairly shallow cool water at a depth of at least 50 fathoms.

The Aquia greensand, where exposed in outcrop, consists of iron-stained coarse glauconitic and argillaceous sand. The base of the greensand, exposed in an old gravel pit at Davies Hill near Galena, shows 9 feet of somewhat argillaceous, glauconitic sand, dark yellowish orange in color and heavily iron-stained. At Frying Pan Point opposite Rolphs Wharf on the Chester River, the Aquia crops out as a hard iron-cemented, glauconitic sandy marl made up almost entirely of fossil casts and molds. Large blocks of the material, 10 feet in diameter, lie strewn about on the shore of the river. Miller (1926, p. 73) described the Chester River outcrop as follows:

Section of Aquia Greensand on Right Bank of Chester River One Mile Northwest of Rolphs Wharf

Description	Thickness (feet)
Talbot formation:	
Sand and loam	3–5
Aquia greensand:	
Very coarse indurated glauconitic sand, much oxidized and iron-stained, with abundant angular quartz pebbles, some of which are nearly ½ inch in diameter. Abundant casts of fossils including *Turritella mortoni*, *Panopea elongata*, *Protocardia lenis*, *Venericardia planicosta*, var. *regia*, *Crassatellites alaeformis*, *Glycimeris idoneus*, *Cucullaea gigantea*	4–6
Yellowish red slightly indurated sand bearing a few fossil casts	5–6
Oxidized glauconitic sand, with occasional tubes of *Vermetus*. Exposed to water's edge	4
Total	9–16

In Kent County and in northern Queen Annes County, Pleistocene deposits at most places overlie the eroded surface of the Aquia greensand. In northeastern and eastern Kent County and in northeastern Queen Annes County, the Calvert formation of Miocene age lies on the beveled edges of the Aquia.

The lithology of the formation was determined chiefly from drillers' logs and from well cuttings. In the log of well Ken-Cd 3 at Chestertown the Aquia greensand is described as 69 feet of gray and black marl containing shells and boulders. The driller's log of well Ken-Be 1 at Kennedyville shows the Aquia greensand consisting of 38 feet of coarse green, brown and red sand with some clay and iron ore.

The sample log of well QA-Be 14 in northwest Queen Annes County, 2½ miles east of Chestertown, shows the Aquia greensand to consist of 32 feet of chiefly medium to coarse sand and marly sand. The Calvert formation lies unconformably on the Aquia greensand.

In the southwestern part of Queen Annes County the Aquia greensand differs lithologically from that of northern Queen Annes County and Kent County. In northern Queen Annes it consists chiefly of brown glauconitic sand; in southwestern Queen Annes, it consists of alternating hard beds of lime-cemented sand and soft beds of greensand or argillaceous greensand, similar lithologically to the Aquia greensand in Anne Arundel County across the Bay. The partial sample log of well QA-Eb 108 at Stevensville shows 42 feet of the formation consisting chiefly of fine to coarse glauconitic sand with some hard layers and some yellow-green clay at its base. The partial sample log of well QA-Eb 107 at Harbor City, Kent Island, shows 15 feet of greensand with hard marl at the top. Further descriptions of the lithology of the Aquia are in Tables 52 and 53. They are from wells Ken-Af 1, -Af 18, -Af 19, -Bf 41, -Cd 6, -Cd 13, -Cd 23, -Cd 29, -Db 34, -Dc 3, -Eb 1, and QA-Be 14, -Bf 5, -Ea 22, -Ec 83, -Ed 4, and -Fa 48.

Structure

The Aquia greensand strikes north-northeast in Kent County and in northern Queen Annes County. Its strike swings west in southern Queen Annes County and then south-southwest across southern Kent Island. Its dip varies from 30 feet to the mile in the north to 15 feet to the mile in the south and southeast (figs. 5 and 6; Pl. 8). In Kent County and northern Queen Annes County much of the upper portion of the Aquia greensand has been removed by erosion. In southern Queen Annes County the top of the greensand can be identified in logs but its base is indeterminate.

Thickness

In eastern Kent County at Massey, 92 feet of the Aquia greensand was penetrated in well Ken-Bg 26. No data concerning its total thickness are available in central and southeast Queen Annes County. In nearby areas in Talbot and Caroline Counties three wells have been drilled through the Aquia greensand into the Cretaceous beds. Well Tal-Cb 89 at Wades Point passed through 231 feet of Aquia greensand, well Tal-Bf 71 at Cordova encountered no strata classed as Aquia, and well Care-Dc 122 at Denton penetrated 121 feet of greensand, questionably the Aquia.

Shifflett (p. 38, and fig. 17, p. 37) describes the trough-like deposition of the Aquia greensand on the Western Shore of Maryland. The continuation northeastward of the axis of the trough passes through southwest Queen Annes County. Southeastward of the trough axis, the beds thin rapidly. In the Wades Point well (Tal-Cb 89), which is close to the axis of the trough, the Aquia greensand attains its maximum known thickness; in the Denton well its presence is doubtful; and in the Cordova well it apparently is absent.

Depth of Wells

The depth of wells tapping the Aquia greensand varies according to the location. In Kent and northernmost Queen Annes Counties they are shallow, ranging from 27 to 140 feet deep In the Centreville area they range frcm 202 to 294 feet deep, in Stevensville from 200 to 283 feet, and on Piney Neck, from 370 to 400 feet.

Water-bearing Properties

The Aquia greensand, with the possible exception of the Pleistocene deposits, is the most productive water-bearing formation of the tricounty area. Although several hundred wells obtain water from the formation, most of them are located in a limited area on Kent Island and on the mainland at Grasonville and Queenstown. In Kent and northern Queen Annes Counties the Aquia greensand consists of rather coarse sand and greensand interbedded with sandy clay; in southern Queen Annes County it consists of alternating hard lime-cemented sand, shell breccia, and soft glauconitic sand and sandy clays.

At Chestertown a 20-foot thick clay occurs in the Aquia greensand about 100 feet below the surface. The quality of the water and the hydrologic properties of the sands are different above and below the clay layer. At Stevensville in southern Queen Annes County a thick clay overlies the greensand, but at places in nearby Grasonville it appears to be absent.

The belt of outcrop and of recharge to the formation lies principally along the sides of the topographic rise which forms the backbone of Kent County at an elevation of about 80 feet. In southern Kent County the outcrop area is topographically low and is covered by Pleistocene deposits.

Table 27 shows the yields and specific capacities of about 350 wells tapping the Aquia greensand. As most of the wells are small-diameter domestic wells the average values are well below the maximum yields obtainable in most areas. In the Stevensville-Queenstown area nearly all the wells are unscreened $1\frac{1}{2}$-inch diameter jetted wells. Yields of wells of all types range from 6 to 300 gpm and average 27 gpm. Specific capacities range from less than 0.1 to 14.3 gpm per ft. and average about 2.9 gpm per ft.

Well QA-Ed 36, owned by the town of Queenstown, yielding 300 gpm, is the best well tapping the greensand. It was drilled in 1931 to a depth of 320 feet. The well reportedly is open below the 6-inch casing which extends to a depth of 186 feet. The specific capacity of the well is not known. Large yields were also obtained from two 24-inch diameter dug wells at Chestertown, Ken-Cd 40 and -Cd 41, completed at depths of 77 and 67 feet, respectively. The wells yielded 230 and 210 gpm each with specific capacities of 5.6 and 5.2 gpm per ft. of drawdown. The wells were subsequently abandoned because of cracked casing.

Hydrologic coefficients

Aquifer tests were made at Massey, Chestertown, and Queenstown to determine the transmissibility and storage coefficients of the Aquia greensand.

Massey test.—On November 22, 1955, a short aquifer test was conducted on the Aquia greensand at the Massey Packing Company plant.

The top of the Aquia greensand lies at about 65 feet below land surface and the greensand is about 77 feet thick. It is overlain by light brown, coarse sand and gravel of the Pleistocene series and underlain by about 30 feet of gray to green clay, silt, fine sand and shell.

TABLE 27
Yields and Specific Capacities of Wells in the Aquia Greensand

Area	Yields			Specific capacities		
	Number of wells	Range (gpm)	Average (gpm)	Number of wells	Range (gpm/ft.)	Average (gpm/ft.)
Galena-Chestertown	25	6–230	34	27	0.1–5.6	1.3
Crumpton-Church Hill	21	8.5–100	48	21	0.3–14.3	5.1
Love Point-Centreville	18	10–55	24	18	0.5–4.0	2.1
Queenstown	20	10–300	50	18	1.4–10.0	3.6
All areas	352	6–300	27	349	0.1–14.3	2.9

The pumped well Ken-Bg 20 is a 6-inch well drilled to $87\frac{1}{2}$ feet, which does not have a screen. At 60 gpm the reported pumping level was 60 feet. On the basis of an extrapolated static water level at 17.5 feet, the well has an estimated specific capacity of 1.4 gpm per foot of drawdown. Preliminary pump tests showed that against little or no head the pump could not maintain a steady discharge rate; thus, a valve was used to reduce the discharge rate in order to prevent surging during the test. Well Ken-Bg 21 is a 6-inch diameter observation well located 102 feet from -Bg 20. It is 99 feet deep. The position or presence of a screen in it is not known.

The aquifer test was begun by pumping well Ken-Bg 20 at an average rate of 60 gpm. The discharge was measured by timing the rate of filling a 55-gallon steel drum. The waste water was discharged to a nearby drainage ditch. The drawdown phase of the test lasted 200 minutes and the recovery phase 120 minutes. Total drawdown of the water level in observation well Ken-Bg 21 was 1.71 feet. The resulting data showed recharge conditions after the first 8 minutes of pumping. Coefficients of transmissibility and storage computed from the initial 8 minutes of drawdown averaged 6,000 gpd per foot and 0.0004, respectively. Recovery coefficients for the same period agree with those obtained from the drawdown data. At best, the calculated coefficients for the initial 8 minutes of drawdown and recovery are approximate.

Queenstown test.—On February 26 and 27, 1955, an aquifer test was conducted on the Aquia greensand at Queenstown, Queen Annes County.

The pumping well, QA-Ed 36, is 320 feet deep and is cased with 6-inch diameter pipe to a depth of 186 feet. The log of the well shows clay from 80 to 164 feet, sand from 164 to 186 feet, and a hard rock layer, probably lime-cemented sand, from 186 to 266 feet. Another sand is present from 266 to 320 feet. The top of the rock layer is probably the top of the Aquia greensand. The well was tested and found capable of producing over 300 gpm. The observation wells, QA-Ed 37 and -Ed 38, were $1\frac{1}{4}$-inch domestic wells located 134 feet and 370 feet, respectively, and in line with the pumping well. The depths of the wells are 241.5 feet and 218 feet below land surface, respectively.

A water-stage recorder was installed at the town pier on Queenstown Creek in order to evaluate the tidal effect on the water levels in the wells.

Well QA-Ed 36 was shut off on February 24, and remained inoperative for almost 38 hours until the test began. During the recovery phases of the test the Queenstown water supply was taken from storage in an elevated tank. No other wells in the Aquia greensand in the immediate area were operated before or during the test except a nearby ice company well, -Ed 14, which pumped 60 gpm for one hour on February 25, and for $1\frac{1}{3}$ hours before the test began on February 26.

Well QA-Ed 36 was pumped at a rate of 300 gpm for the first 32 minutes of the test, discharging water from a fire hydrant to a natural drainage ditch. At the end of 32 minutes it was found that the water pressure of the town system, excluding the tank storage, was not great enough to maintain normal pressure in the mains. The fire hydrant valve was then regulated to maintain a safe pressure, which limited the discharge of the well to about 200 gpm. The average computed total pumping rate for 705 minutes, the length of the drawdown phase, was 242 gpm, the observed rate was 212 gpm. The observed rate of pumping was determined by an orifice and piezometer tube. The town consumption during the pumping phase of the test was determined beforehand by measuring the amount of water used from the storage tank during the pre-test recovery period. Recovery measurements were made for 720 minutes.

During the first 32 minutes of pumping, water levels lowered 4.19 feet in well QA-Ed 37 and 1.94 feet in well -Ed 38. Total observed drawdown after 705 minutes of pumping was 5.58 feet in well QA-Ed 37 and 3.81 feet in well -Ed 38. Only the initial 32 minutes of drawdown was used to compute the hydrologic coefficients. Data for that period matched the Theis type curve very well, and the calculated coefficients of transmissibility for wells QA-Ed 37 and 38, respectively, are 36,000 and 40,000 gpd per foot. The storage coefficients are 0.0002 and 0.0003, respectively.

Using the Theis nonequilibrium, the modified Theis straight-line, and the Thiem equilibrium methods of analysis, the coefficient of transmissibility for the recovery phase of the test averaged 32,000 gpd per foot. The coefficient of storage averaged 0.0003. On the basis of both drawdown and recovery data an average coefficient of transmissibility would be about 34,000 gpd per foot and the coefficient of storage 0.0003.

A large cannery well, also tapping the Aquia greensand, is about 1,500 feet east of the Queenstown well. It is reported that pumping from this well lowers the water levels at Queenstown during the summer months. Figure 3, based on data from the aquifer test at Queenstown, shows that after 30 days of continuous pumping at 240 gpm, water levels will be lowered 5 to 6 feet at a distance of 1,500 feet.

The test data indicate that the Aquia greensand is capable of large-scale development in the Queenstown area if consideration is given to adequate spacing of wells.

Chestertown test (northwest area).—Chestertown obtains its water supply principally from the Aquia greensand in its outcrop zone. Well logs show lithologic heterogeneity in the sediments comprising the Aquia greensand. Plate 9 shows the relative position of the producing sands and semi-permeable deposits in the Aquia greensand in the Chestertown area.

In the Chestertown area there are two water sands at different depths in the Aquia greensand. The shallower wells in the Aquia range in depth from 7 feet to 27 feet below mean sea level and the deeper wells range in depth from 55 feet to 88 feet below sea level. Logs of wells Ken-Cd 15, -Cd 34, and -Cd 33 show a clay bed 35 feet thick in -Cd 15 which thins to 19 feet in -Cd 34 and to 9 feet in -Cd 33. The clay separates the upper sand from the lower sand. The log of -Cd 21, located 365 feet east of -Cd 33, showed no separating bed of clay. It is 128 feet deep and produces from the lower sand. As the sediments vary in thickness, areal extent and lithology, it is likely that the upper and lower sands of the Aquia are hydrologically connected.

Comparison of water levels of wells in the area producing from the lower sands, shows they are nearly the same. In wells 3, 4 and 5 at the Chestertown Ice Plant (?), reported to be 100, 160, and 170 feet deep, the static water level in 1918 was −30 feet (Clark and others, p. 276). Today the static water level in that area is practically the same, −25 to −30 feet. Thus, there has been no extensive dewatering of the aquifer as a result of pumping for the town supply. The fact that there are no flowing wells in the Chestertown area at present in either the upper or lower sands of the Aquia indicates the presence of imperfect confining layers in the formation.

On March 16, 1955 a short preliminary aquifer test was run at the Vita-Foods plant at Chestertown. Well Ken-Cd 21 was pumped and water level changes were measured in -Cd 32. Well -Cd 21 is screened from −107 to −127 feet, and -Cd 32 is screened from −43 to −55 feet and −80 to −96 feet. Elevations of the wells are 40 and 42 feet above sea level, respectively. Well -Cd 21 was pumped at an estimated rate of 110 gpm for 395 minutes, during which time the water level in -Cd 32 lowered 0.21 foot. The test suggested a definite hydrologic connection between the upper sands screened in well -Cd 32 and the lower sands screened in well -Cd 21. As the coefficients computed on a preliminary basis seemed out of line with the reported pumping rates and specific capacities of wells -Cd 21 and -Cd 32, it was decided to conduct a longer test.

On April 2 to 4, 1955 a test was conducted utilizing the same wells, but pumping well -Cd 21 at a rate of only 93 gpm. The pumping lasted 2,700 minutes. The drawdown in -Cd 32 measured with an automatic water-stage recorder was 0.518 foot. Recovery measurements in the well were made for 325 minutes. Figure 7 shows a semilog graph of drawdown and time. After 800 minutes of pumping, the rate of drawdown increased and continued at a uniform rate to the end of the test, indicating a limiting or barrier-like geologic condition. It may be assumed that at this site there is leakage or recharge of water from the upper sands to the lower sands. The leakage thus helps to maintain water levels in the lower aquifer.

Future development of the sands should be preceded by adequate test drilling and further aquifer tests of each sand in order to determine which will provide the best wells.

Chestertown test (southeast area).—The Chestertown municipal well field is located about 800 feet northwest of the Chester River and 1,000 feet northeast of U. S. Route 213. Water is produced from four wells spaced less than 100 feet apart. They are Ken-Cd 2, -Cd 33, -Cd 37 and -Cd 38, and they supply from 350,000 to 750,000 gallons per day according to seasonal needs. The aquifer is apparently the upper sand in the Aquia. At this locality it is about 40–45 feet thick.

Prior to November 1915 the city water supply was obtained from well -Cd 3 that flowed an estimated 50 gpm and from three springs that produced up to 150,000 gpd. The springs issued from the Pleistocene deposits and were located northeast of the low drainage gut on the northeast side of U. S. Route

FIGURE 7. Semi-log Graph of Water Level in Well Ken-Cd 32 at the Vita-Foods Plant near Chestertown

213 (Maple Avenue). The water from wells -Cd 3 and -Cd 39 was of such poor quality it was used only in emergencies. From 1915 until 1930 (when wells -Cd 40 and -Cd 41 were drilled) the water supply was obtained from 14 wells, nine $4\frac{1}{2}$-inch diameter and five 3-inch diameter wells that yielded an estimated 175,000 gpd. The wells ranged from 59 to 70 feet in depth and were equipped with screens which ranged from 20 to 30 feet in length. The wells were located at the site of the present well field along two parallel north-south lines 60 feet apart. There were seven wells in each line spaced at intervals of 50 to 100 feet. The wells were connected to a common suction line. The total capacity was 300 gpm, although the actual operating capacity was only about 235 gpm. The comparatively low productivity of individual wells was attributed to encrustation of the screens, inefficient screen design, and fineness of the producing sand.

In June 1916 the $4\frac{1}{2}$-inch wells were tested individually and produced 40 gpm and the 3-inch wells were tested individually and produced 75 gpm. The static water level at the pumping house, the site of present well -Cd 38, was about 6 feet below land surface or 2 feet above sea level. The Maryland Department of Health conducted a series of pumping tests on the wells, nine were pumped and five were used as observation wells. A limited number of drawdown and recovery water level measurements were made and pumpage was measured by a Venturi meter. Utilizing the 1916 test data, a coefficient of transmissibility of the upper sand in the Aquia was estimated to be about 24,000 gpd per ft. On the basis of the pumpage and water level records from 1916 through 1953, the coefficient of transmissibility was computed to be approximately the same.

Wells -Cd 40 and -Cd 41 were cased with 18-inch inside diameter concrete pipe, screened and gravel packed. The reported yields when drilled were 230 and 210 gpm and the drawdowns 41 and 40 feet, respectively. These wells were abandoned and filled in 1935 when the casing cracked and failed. Static water levels in -Cd 40 and -Cd 41 when drilled were reported to be 11 and 2.5 feet below the land surface, respectively.

The static water level in the Aquia greensand at the municipal well field during the period 1916 to 1953 has lowered an estimated 7 feet (or to 5 feet below sea level). The recharge rate to the aquifer must therefore be relatively high and the lack of lowering water levels, in spite of increased pumpage, can be attributed to the readiness of recharge to the Aquia from the overlying sandy Pleistocene sediments at the surface and to the fairly steep hydraulic gradients to the northwest, in the direction of outcrop of the aquifers. The steep gradients permit more rapid movement of water through the aquifers. Thus the natural movement of water in the Pleistocene deposits and sands of the Aquia is to the south and southeast in accordance with differential water levels existing between the city well field and the outcrop area in the uplands to the northwest.

Test borings for the Chester River bridge show a layer of mud and silt on the river bottom which attains a maximum thickness of 38 feet. The muds thin to a featheredge toward the east and west shores of the river. Underlying the mud is a sand of probable Pleistocene age which extends across the river as a continuous unit. It reaches a thickness of about 35 feet under the western half of the river bottom and thins toward the eastern shore. The sand apparently fills a former erosional channel in the river. The Pleistocene sand is underlain by the Aquia greensand. It appears, therefore, that the formations overlying the Aquia greensand do not form a completely impervious seal beneath the brackish river water.

A graph (fig. 8) of the chloride content of water samples collected at random from wells Ken-Cd 2, -Cd 33, -Cd 37 and -Cd 38 shows a definite but slight increase of chloride concentration in pumping wells at the municipal well field. The graph shows a direct relationship between the quantity of water pumped to the chloride concentration. The wells nearest the source of salt water have the highest chloride. Well -Cd 2, which is fartherest from the source of the chloride has the lowest chloride. Progressively increasing concentrations of chloride appear in order in wells -Cd 37, -Cd 38 and -Cd 33, and in order also towards the source of salt water either eastward from the river or southward from the drainage gut.

Increased pumping since 1930 has certainly deepened and widened the cone of depression. Although the natural hydraulic gradient in the Pleistocene deposits and in the Aquia greensand is eastward towards the river, if future pumpage increases in the vicinity of the well field, the balance between the natural hydraulic gradient and the pumping cone of depression may be upset as the cone of depression spreads beneath the brackish water of the Chester River.

The possibility of salt water intrusion in the Chestertown area may be further enhanced by the general rising trend of mean sea level along the Atlantic Coast (Marmer, 1951). Over the period of 1930–1951 mean sea level at Baltimore has risen 0.02 of a foot a year or almost a half a foot since 1930. This would mean that rising tide water covers the swampy estuarine shoreline more frequently, infiltrating downward to the underlying fresh water.

Recharge

The recharge area of the Aquia greensand is roughly its outcrop belt and those parts of the formation lying beneath topographically high interstream areas. From the Delaware line to west of Chestertown the altitudes of the highest portions of the outcrop area are between 70 and 80 feet above sea level; southwest of Chestertown to the Rock Hall and Eastern Neck areas altitudes are from 60 feet to sea level.

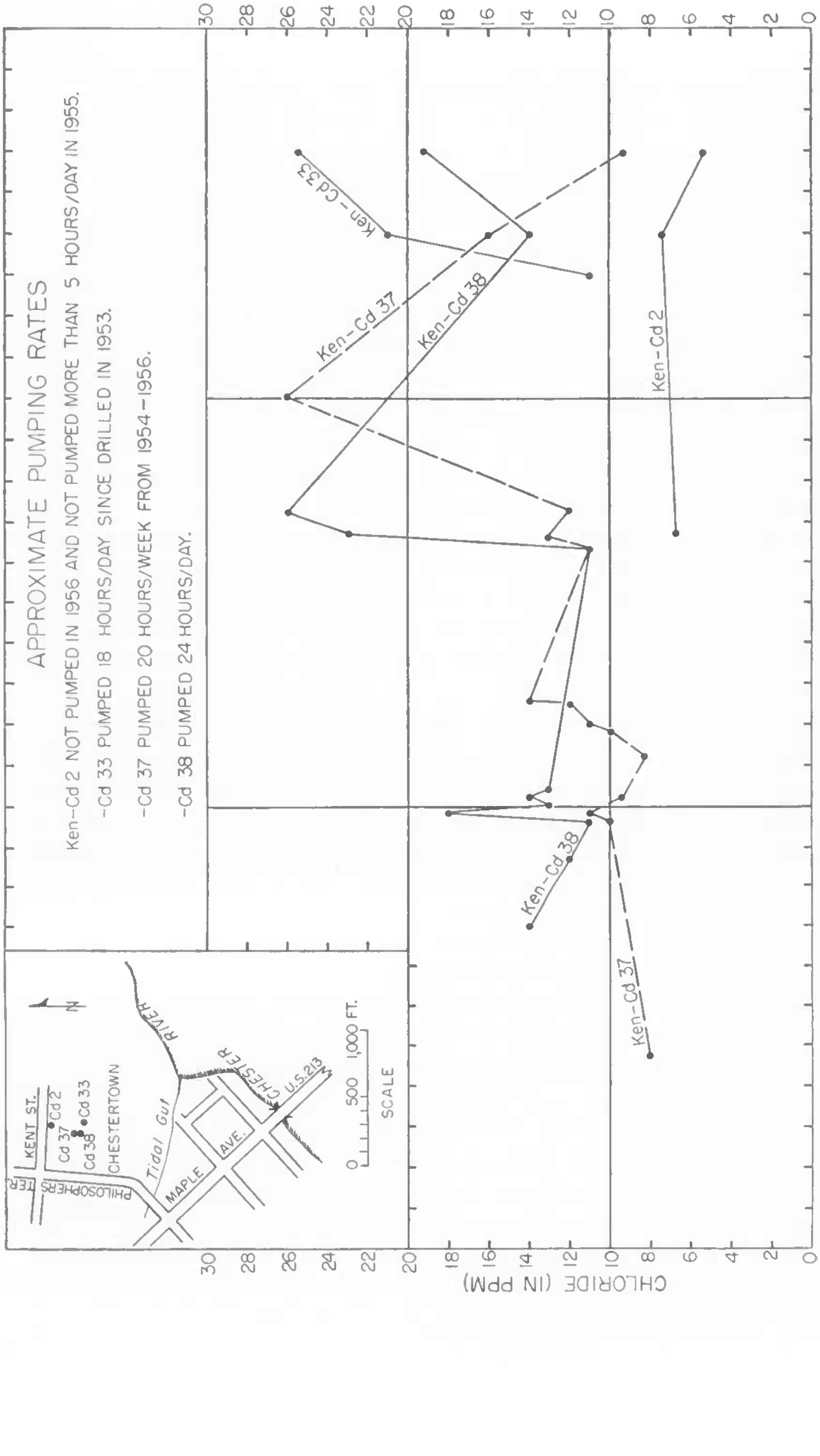

FIGURE 8. Chloride Content of Chestertown Public-supply Wells from 1934 to 1956

Recharge to the Aquia greensand may occur in three ways, by direct movement of water into the exposed portions of the greensand, by recharge from the overlying pervious Miocene and Pleistocene deposits, and by upward movement from the underlying aquifers.

There is little direct exposure of the formation. Its outcrops are confined chiefly to the banks of the larger streams. Recharge through the overlying Pleistocene and Recent deposits is believed to be the principal source of the water in the greensand in Kent County and in northern and western Queen Annes County. From Rock Hall and Eastern Neck to the Western Shore the sub-outcrop belt of the Aquia greensand lies beneath Chesapeake Bay and beneath deposits of Pleistocene and Recent age on the Bay floor. However, borings for the Bay Bridge show that in places beneath the Bay the Aquia greensand is missing entirely and has been replaced by younger deposits of Pleistocene age.

As the Pleistocene deposits above the greensand are believed to be largely the source of recharge to the aquifers, the water levels in dug wells tapping the Pleistocene deposits are compared with the water levels in wells tapping it. In the area north of Millington and east to Kennedyville, where water levels in wells tapping the Aquia are 35 to 50 feet above sea level, the levels in the shallow wells average about 50 feet and are as high as 63 feet. In eastern Kent County at the Delaware line the land is swampy, indicating the water table is very close to the surface. South of the Chester River between Chestertown and Crumpton, the Aquia greensand is separated from the Pleistocene deposits by the Calvert formation. This unit is thin near the Chester River and thickens southward and eastward. The altitude of the water table in the surficial deposits in this area ranges from 0 to 60 feet and averages about 45 feet above sea level. The water level in the wells tapping the greensand is slightly lower, however, and ranges from 20 to 40 feet above sea level. West of Chestertown the water table ranges from a few to about 80 feet and averages about 17 feet above sea level. Water levels in the wells tapping the Aquia greensand in the vicinity of Chestertown range from 29 feet above sea level to 5 feet below sea level (fig. 9). Near Rock Hall and Langford Bay the altitude of the water table ranges from a few to 19 feet and averages about 10 feet.

In Queen Annes County, in the area between Church Hill and Centreville, the altitude of the water surface in the Aquia greensand is low, averaging about 8 feet. The altitude of the water table in the surficial deposits averages about 43 feet above sea level. This may indicate that less recharge to the greensand is occurring by means of vertical leakage through the Calvert formation. In the Grasonville-Stevensville area insufficient water levels are available in dug wells to obtain an average altitude of the water table. It is assumed, however, to be at or near sea level in both the shallow and deep wells.

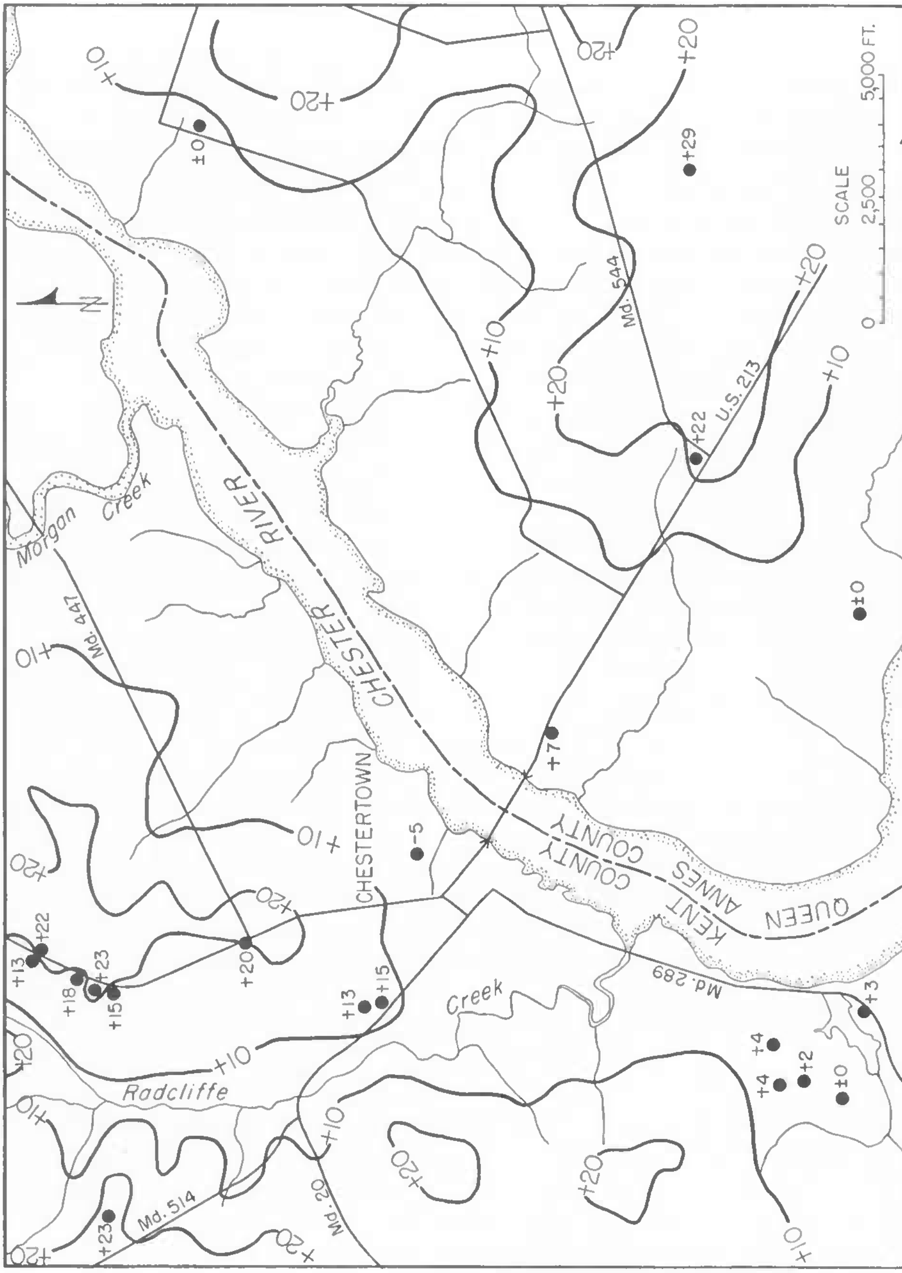

FIGURE 9. Map showing Water Levels in the Aquia Greensand in the Chestertown Area in 1956

Differences in water levels in wells tapping the Aquia are also due to the fact that the formation is not homogeneous. Different sands within the formation can have different hydrostatic pressures. The logs of wells at Chestertown show two aquifers in the greensand separated locally by a clay bed. These aquifers yield water of somewhat different chemical character.

Nanjemoy Formation

Distribution and Lithology

The Nanjemoy formation of the Eocene series has not been found in outcrop in the tricounty area. It has been recognized in wells on Kent Island and in the Wades Point well in Talbot County, and may be present at Cordova in well Tal-Bf 71 (Rasmussen and Slaughter, 1956, p. 304). It was not logged in the Denton well (Care-Dc 122) in Caroline County (Rasmussen and Slaughter, 1956, p. 254). The Nanjemoy formation may be present in wells in the tricounty area only in the extreme southwest part of Queen Annes County. It apparently wedges out northward. The nearest outcrop of the Nanjemoy formation is in Anne Arundel County at Turkey Point, 6 miles west of the southern tip of Kent Island.

The Nanjemoy formation at Wades Point consists of greenish silt and clay and streaks of coarse sand (Tal-Cb 89, Table 53). The basal pink and gray clay is absent in this section.

The Nanjemoy formation lies on the Aquia greensand. It is overlain in northern Kent Island by the Calvert formation and in southern Kent Island by the Piney Point formation. If present in southern and southeastern Queen Annes County, it is overlain by the Piney Point formation.

Structure

Structurally, the Nanjemoy is a wedge-shaped body of sediments having a regional dip of about 20 feet per mile to the southeast.

Thickness

The thickness of the Nanjemoy formation in the Wades Point well is 117 feet. What its thickness may be elsewhere in southern Queen Annes County is not known.

Water-bearing Properties

The Nanjemoy formation is not now a source of ground water in the tricounty area. Several hundred wells have been drilled through the formation and none apparently found enough water to make a yield test worthwhile. The formation is, however, sandy at places and may be locally water-bearing. In Caroline, Dorchester, and Talbot Counties, it is classed as a "leaky aquiclude" (Rasmussen and Slaughter, 1956, p. 60). This term probably applies in southern Queen Annes County.

Piney Point Formation

Rocks of Jackson (Eocene) age were first recognized in Maryland by Shifflett (p. 26–30) from wells in Calvert County and on the Eastern Shore. The formation was described and named by Otton (1955, p. 85).

The Piney Point formation does not crop out on the Eastern Shore, nor is it definitely known to be present in the subsurface in the upper tricounty area, although it may be present in well QA-Ec 83 near Grasonville. The formation occurs in the Wades Point well which lies just south of the southern border of Queen Annes County and hence is certainly present in some of the most southerly wells on Kent Island. The formation is 49 feet thick in the Wades Point well, but it probably wedges out toward the north.

The Piney Point formation is lithologically similar to the Nanjemoy formation in the Wades Point well. A microscopic study of well samples of the two formations did not yield criteria for separating them lithologically.

South of Queen Annes County, the Piney Point formation is one of the most productive water-bearing formations of the Eastern Shore. In Queen Annes County no wells are known to yield water from it.

MIOCENE SERIES

Calvert Formation

Distribution and Lithology

The Calvert formation, the only geologic unit of Miocene age identified for certain in the tricounty area, crops out near Millington in the southeast corner of Kent County (Pl. 4; figs. 5 and 6).[1] It is present in most of Queen Annes County although largely concealed by overlying Pleistocene deposits. A few small outcrops along the Wye and Chester Rivers form its westernmost exposures in Queen Annes County. All exposures of the formation are poor, and no very complete section of it was observed. In outcrop the Calvert formation consists of light cream-colored sand and clay. In places blue or drab clay, diatomaceous sandy clay, and indurated fossiliferous beds are present. A sample of sandy clay from an outcrop on Route 213, one mile north of Centreville, consists of about 60 percent clay and silt, 10 percent coarse sand, and 30 percent medium-coarse to very fine sand. Diatomaceous clay is reported by Miller (1906, p. 5) to outcrop near Church Hill.

In an auger hole $2\frac{1}{2}$ miles south of Galena, a 5-foot bed of light brownish

[1] The overlying Choptank formation (also of Miocene age) may be present in the extreme southeast corner of Queen Annes County, but its presence was not definitely established.

gray, slightly sandy clay is present. The clay is overlain by 24 feet of clay of Pleistocene age. On the Wye River the Calvert formation consists chiefly of cemented sandy beds containing abundant fossil casts. Drillers' logs indicate that the formation is made up chiefly of blue-black sandy clay in the central and southeastern part of Queen Annes County. The Calvert formation is shown in the log of well Tal-Af 8 at Queen Anne to consist of gray clay, brown clay, and sand and shells. Some strata of the Choptank formation may be included in the upper part of the log.

The Calvert formation can be distinguished very easily from the underlying Eocene greensands, but is is not easy to pick the contact between the Miocene beds and overlying Pleistocene sand and clay. At most places, however, a coarse gravel bed appears to separate the Miocene from the Pleistocene deposits.

Though the Calvert formation is of marine origin, as is shown by its marine shells and diatom tests, the deposits were probably laid down in shallower water than were the underlying Eocene deposits. The conditions of deposition were probably similar to those of the present day submerged coastal plain. The surface on which the sands and clays were deposited was an eroded surface of Eocene rocks. During Miocene (Calvert) time the sea was much more extensive than during Eocene time. On the western shore the Calvert formation overlaps the Eocene deposits and in places lies on Cretaceous or Precambrian rocks.

Thickness

The Calvert formation thickens toward the southeast, the direction of dip. It is probably not more than 15 feet thick in Kent County. At Centreville in Queen Annes County it is about 65 feet thick. At Wades Point it is 95 feet thick, and at Queen Anne it appears to be over 165 feet thick, although some strata of the Choptank are probably included.

Structure

The Calvert formation strikes northeast to east and dips about 15 feet per mile to the southeast.

Water-bearing Properties

About 24 wells in Kent and Queen Annes Counties obtain water from the Calvert formation, but the yields and specific capacities of most of the wells were not reported. Many wells have been drilled through the Calvert formation to deeper aquifers as water was not found in the formation in sufficient quantity to furnish the required supply.

The yields of 8 wells producing from the Calvert formation have been reported. The yields range from 15 to 100 gpm and average 43 gpm. Specific capacities of only 5 wells have been reported. They range from 0.9 to 10.0 gpm per ft. and average 5.0 gpm per ft. of drawdown. The comparatively high yields and specific capacities of wells tapping the Calvert formation may be the result of vertical leakage to the sands from contiguous sands and gravels in the overlying Pleistocene deposits.

Well QA-Bg 6 near Hackett Corners is the best well in the formation. When completed in 1951 it reportedly yielded 100 gpm from a crevice in a blue clay encountered at a depth of 63 to 85 feet. In 1947 well QA-Ag 4 near Millington yielded 60 gpm with a specific capacity of 6.5 gpm per ft. This well ends in a zone of permeable "sand rock" encountered at a depth of 60 to 67 feet. Four wells in the town of Queen Anne (QA-Ef 2, Tal-Af 5, Tal-Af 6, and Tal-Af 7) yield from 15 to 40 gpm with specific capacities ranging from 0.9 to 4.4 gpm per ft. These wells are near the bank of the Tuckahoe River and may receive recharge from it.

PLIOCENE(?) SERIES

The two geologic maps of Cecil County (Bascom, Shattuck, and others, 1902; Bascom and Miller, 1920) show small disconnected areas of gravel identified on the 1902 map as the Lafayette of Neocene age and on the 1920 map as the Brandywine formation of Pliocene(?) age. In this report the gravel in the northern part of Cecil County is called Bryn Mawr gravel, and that in the Elk Neck area the Brandywine gravel.

Bryn Mawr Gravel

Distribution and Lithology

The term Bryn Mawr gravel was first used by Lewis (1880) for high level gravels near Bryn Mawr, Pennsylvania. The term fell into disuse until 1924, when Bascom (1924) redefined it and applied it to gravels which are at an elevation of 390 to 480 feet in southeast Pennsylvania, northern Delaware, and Cecil County, Maryland. The Bryn Mawr gravel in Cecil County rests unconformably on the Patuxent, Patapsco, and Raritan formations. At a few places, as at Bay View, it lies on schists and intrusive rocks. According to Cooke (1952, p. 38) the Bryn Mawr gravel, wherever recognized, ". . . lies near the debouchure of a river from the Piedmont onto the Coastal Plain. The formation seems to have been deposited as a series of disconnected fans." The Cecil County deposits presumably were part of the fan of an ancient Susquehanna River. Whether the gravels were deposited on the land or beneath the sea is not known. All that remains of them now are disconnected patches on some of the high hills.

No fossils are found in the deposits. Their stratigraphic relationship to the underlying rocks indicates merely that they are post-Raritan in age. The Bryn Mawr gravel is generally assigned a Pliocene(?) age. Whether the deposits extend farther south and southeastward and are there buried is not known. A thin gravel bed occurs at most places at the base of the Pleistocene deposits in Cecil, Kent, and Queen Annes Counties, but this is interpreted as being of Pleistocene rather than of Pliocene(?) age.

The Bryn Mawr gravel consists chiefly of a poorly sorted agglomeration of gravel and coarse sand. Exposures in a quarry about $\frac{3}{4}$ mile south of Bay View (elevation 386 feet) show an unsorted mixture estimated to be 60 percent gravel and 40 percent coarse sand. A few cobbles are present. The gravel grades downward in size from about $1\frac{1}{2}$ inches in maximum diameter. The material is moderate orange to light-gray. In another nearby quarry, gravel is more abundant and pebbles are coarser (about 2 inches in maximum diameter). The gravel there rests on a bed of white clay derived from the underlying Patuxent formation or from weathered granodiorite.

Thickness

The thickness of the Bryn Mawr gravel cannot be accurately determined. Drillers' logs indicate thicknesses of sand and gravel ranging from 35 to 86 feet, but these figures probably include some Lower Cretaceous strata. The average thickness observed in outcrop is about 20 feet.

Water-bearing Properties

The small extent of the Bryn Mawr gravel and its location on hilltops, where it may be largely unsaturated, limits its value as a source of ground-water supply. No drilled wells are known to obtain water from the gravel, although a few dug wells at Bay View probably do.

Brandywine Gravel

On some of the hilltops on Elk Neck about a dozen small isolated patches of gravel are mapped at elevations of 220 to 280 feet. The maximum extent of these patches is $\frac{1}{4}$ mile. Bascom and Miller (1920) designated them as Late Brandywine. Later (1924) Bascom applied the name Bryn Mawr to the earlier Brandywine gravel, and the name Brandywine to the Late Brandywine gravel.

The Brandywine gravel is of little importance hydrologically in the tricounty area.

QUATERNARY SYSTEM

Pleistocene Series

Deposits of Pleistocene age form a thin covering over most of the Coastal Plain in southern Cecil, Kent, and Queen Annes Counties. At many places streams have cut through the Pleistocene covering and have exposed the underlying older strata. The materials occur as terrace deposits or as plains deposits. They are largely of fluviatile origin, but the lowermost terrace is in part marine or estuarine.

Plate 10 is a generalized representation of the pre-Pleistocene surface on which the Wicomico and Talbot formations were laid down, based on well drillers' logs, field examination, and the geologic maps of the area. The pre-Pleistocene surface is similar in a general way to the present land surface. Much of the surface along the Bay and estuaries now lies below sea level. In the interstream areas the surface is above sea level but about 30 to 40 feet below the present land surface. The existence of river valleys or estuaries that correspond to the present estuaries and terracing are plainly shown. A shallow depression runs from Betterton in a southwest direction to Worton Creek. A large depression under and around Eastern Bay suggests that the Chester River at one time ran directly into Eastern Bay.

Plate 10 shows in a general way the distribution and thickness of the Pleistocene deposits. In the central area of Kent County, the altitude of the land surface is about 80 feet; the thickness of the Pleistocene, therefore, is about 40 feet. It also indicates those places where the surface is below sea level. This is important in ground-water development, for if a well is dug to obtain water from the Pleistocene deposits where they are below sea level and near an estuary or tidal river, the aquifer may be subject to salt-water encroachment if heavily pumped.

The subdivision of the deposits made by Shattuck (1906) and used on the geologic maps of the three counties is:

Formation	Elevation, in feet, above sea level
Sunderland	100–180
Wicomico	45–100
Talbot	0–45

The three formations are separated from one another in most places by low scarps.

In recent ground-water bulletins (Bennett and Meyer, p. 68; Otton, 1955, p. 99) the Pliocene(?) and Pleistocene deposits are grouped in two units—upland deposits lying higher than 40 feet above sea level and lowland deposits lying below 40 feet above sea level. According to this classification the Bryn Mawr, Brandywine, Sunderland, and Wicomico formations are upland deposits and the Talbot units lowland deposits.

Sunderland Formation

Distribution and Lithology

The Sunderland formation occurs only in Cecil County along the Fall Zone and on Elk Neck as remnants of old terrace deposits along stream valleys and in the interstream areas. It rests unconformably on the weathered surface of the crystalline rocks or on unconsolidated deposits of Cretaceous age. The formation consists of sand, clay, and lesser amounts of gravel. It is probably of fluviatile origin.

Thickness

The maximum thickness of the Sunderland formation observed in outcrop and reported in well logs is about 25 feet.

Water-bearing Properties

The small extent and lack of connection between the scattered deposits of the Sunderland preclude their becoming large aquifers. The texture of the material—medium and coarse sand and gravel—which makes up the deposits permits ready passage of the water. The deposits appear to be well-drained. No drilled wells in the area were inventoried which yield water from the Sunderland formation. Two dug wells 1 mile north of Charlestown (Ce-Bd 54 and -Bd 55) penetrate the formation. One is reported to go dry and the water level in the other gets very low at times.

Wicomico Formation

The Wicomico formation is the most widespread of the formations of Pleistocene age and is present in the three counties. It is probably of fluviatile origin. Physiographically, the deposits fall into two general types—terrace and plains deposits. The chief difference between the terraces and the plains is that on the terraces the distance between the top of the lower scarp and the base of the next higher scarp is small—a mile or less—whereas the plains have widths up to 40 miles. In most of the tricounty area the Sunderland terrace scarp is absent; and consequently no upper scarp bounds the Wicomico plain except in central Cecil County.

TERRACE DEPOSITS

Distribution and Lithology

The terrace deposits of the Wicomico formation are best developed around the head of Chesapeake Bay, along the Northeast River, and on the east side of Elk Neck. East of the Elk River from Elkton southward the deposits are of the plains type. The terraces lie between 45 feet and 120 feet in altitude. They average about a mile wide, and are much dissected by streams. Their surfaces slope downward very noticeably toward the major estuaries of the Bay. On the west side of Elk Neck most of them have been destroyed by shore erosion.

Lithologically, the terrace deposits in the Wicomico consist of sand, clay, silt, and, at places, gravel. Their exposures are so poor, however, that no continuous outcrop sections were found. Patches of gravel mixed with coarse sand are seen at places along road cuts. The gravel is well rounded and averages between ½ inch to 1 inch in diameter. Small cobbles up to 4 inches are fairly common.

Thickness

The terrace deposits of the Wicomico formation are thin, probably averaging not much over 12 feet. One well penetrated a thickness of 24 feet of sand and gravel, but two others thicknesses of 8 and 10 feet.

Water-bearing Properties

No drilled wells are known to yield water from the Wicomico, although a few shallow dug wells may do so. Owing to their thinness and their limited areal extent the terrace deposits of the Wicomico have little value as a source of ground-water supply.

PLAINS DEPOSITS

Distribution and Lithology

The plains deposits of the Wicomico formation mantle Cecil County east and south of the Elk River and cover the central and eastern parts of Kent and Queen Annes Counties. Characteristically, the deposits form broad plains of low relief that slope gently toward stream courses. In the eastern part of the counties the surface, which is slightly hummocky, contains basins enclosed by low ridges. The gentle relief of the area is important hydrologically, as it is one of the factors that govern the infiltration, movement, and storage of water derived from precipitation. Because of the low relief, surface run-off is small over most of the area underlain by deposits of the Wicomico, but the rate of infiltration is high as shown by the absence of marshy land and by the intermittent character of many of the streams. Near the large estuaries and the Bay these conditions are somewhat modified.

The plains deposits of the Wicomico formation consist of a heterogeneous mixture of sand, clay, silt, and gravel. Grain sizes range from clay to boulders 3 or more feet in diameter. Sorting of the material is poor although broad distinctions can be made between predominantly sandy clay and silt beds, and predominantly sand and gravel beds. Where bedding is recognized, crossbedding is the distinctive feature. A rather thin, but generally a fairly coarse, gravel bed marks the base of the formation at many places. The large boulders (one of them measured 3 x 2 x 1½ feet) imbedded in the sand and gravel were rafted in by ice. The effects of ground ice are shown in exposures by the contortion and fracturing of clay and silt beds (Broedelboden). It may be that the basins in the Wicomico plain were formed by the stranding of floe ice and possibly by the melting of ground ice.

The fine sand is chiefly quartz, but the coarse sand and gravel contain other minerals from the Piedmont rocks and many fossiliferous chert fragments derived from the Paleozoic rocks of the Appalachian area to the north. Quartzite pebbles and boulders from the Paleozoic areas are also common. Most of the large rafted boulders are from the rocks of the Piedmont.

The best exposures of the plains deposits are in Kent County along the south shore of the Sassafras River near Betterton. A measured section described by Miller (1926, p. 63) is:

Wicomico formation at Betterton in Kent County

Description	Thickness (feet)
Loam	4
Coarse red argillaceous sand	3
Coarse gravel containing limonite nodules	4
Coarse red sand	6
Gravel, sand	1
Light-colored clay	.5
Light-colored sand	1
Dark-colored sand	.2
Light-colored sand	.5
Very coarse, light-yellow, crossbedded sand containing many solitary pebbles and lenses of gravel	18
Coarse gravel	2
Very coarse, light-yellow, crossbedded sand containing thin gravel bands	13
Coarse gravel	.3
Very coarse, pebbly, light-yellow sand	6
Coarse gravel	.5
Coarse gravelly, light-yellow sand; ironstone conglomerate at base	9
Total	69.0

The section is thicker than the average deposit of Wicomico and is much more sandy and gravelly. More typical is the following section along the Sassafras River bluffs near Howell Point:

Wicomico Formation near Howell Point, ½ mile West of Harris Wharf in Kent County

Descriqtion	Thickness (feet)
Wicomico formation:	
Loam	8
Variegated pink and yellow clay	5
Gravel, sand	3
Yellow clay	.5
Variegated clay, pink and light-green	3
Coarse gravel and sand	13
Total	32.5

The log of well QA-Cf 5 at Price shows that the formation consists of 45 feet of clay, yellow and white sand, and gravel. The log of an augered hole, 14 feet deep, near well -Cf 5 showed 12 feet of clay at the surface followed by 2 feet of coarse, white sand and gravel.

Unfortunately, outcrops of the plains phase are restricted to the western part of the tricounty area, whereas most of the wells that tap the deposits lie in the central and eastern parts of the area. An outcrop near the town of Queen Anne shows about 5 feet of coarse cross-bedded sand lying on a 2-foot gravel bed, which in turn lies on coarse, cross-bedded, iron-stained sand which forms the bottom of the gravel pits.

Table 28 indicates that the deposits of Cecil County contain 20 percent more clay than those of Queen Annes County, which contain 92 percent sand and gravel and 8 percent clay. The deposits in Kent County are intermediate in

TABLE 28

Lithologic Types in the Wicomico Formation

County	Total footage logged	Percent clay	Percent sand and gravel
Cecil	1,108	28	72
Kent	2,543	15	85
Queen Annes	1,252	8	92
All counties	4,903	17	83

character. The well logs show that clay predominates in Cecil County north of the Bohemia River and in Kent County in the Kentmore Park area and possibly between the Chesapeake Bay and the Kennedyville area (only a few logs were obtained from this area). Sand and gravel predominate in the southern part of Cecil County, in the Millington area of Kent County, in northern Queen Annes County, and in eastern Queen Annes County from the Chester River to the Talbot County boundary. No logs showing the lithology are available for the extreme east side of Queen Annes County. Areas in which gravel predominates are likely to yield larger ground-water supplies than those in which clay predominates. Local variations in the thickness of the saturated deposits and in their permeability also affect the availability of ground water.

Thickness

In the eastern and central flat-lying areas of the counties, the deposits of Pleistocene age (believed to be mainly Wicomico) are rather thin, averaging about 25 feet thick. The thin areas correspond to the topographically high areas of the surface of deposition. Sand and gravel deposits ranging from 60 to

90 feet thick form high bluffs along the Bay shore and Sassafras River. The basal surface of deposition here is above sea level. Deposits of moderate thickness, about 40 feet, occur near Crystal Beach, near Millington, east of Chestertown, near Rock Hall, and on Kent Island.

Water-bearing Properties

The Wicomico formation is the most extensively used of the aquifers in the area. About 57 percent of the wells—practically all dug or driven wells of small capacity—yield water from this formation. The amount of water used is not large as it is used almost entirely for farm and domestic purposes. In the future, however, with the spread of supplemental irrigation, farmers may turn more and more to this aquifer as a source of water supply.

Inasmuch as the formation is made up largely of sand and gravel, its permeability and porosity favor the infiltration, storage, and recovery of ground water. The zone of saturation is comparatively thick in the flat undissected upland area, but is thinner where the deposits are deeply dissected by streams as the presence of ravines and valleys permits more rapid and complete drainage of ground water from them. The deposits in the high flat interstream areas are generally fairly thin and are not capable of storing large quantities of water. As already noted, the deposits are structurally heterogeneous—beds are not continuous and sorting is rather poor. Gravel is generally rather fine and at most places where it has been seen is mixed with sand and clay.

As nearly all wells tapping the Wicomico formation are domestic dug and driven wells, equipped with pumps yielding only a few gallons a minute, reliable data on the yields and specific capacities of the wells could seldom be obtained. However, the yields of 15 wells, for which the data are available, range from 3 to 200 and average 51 gpm. Specific capacities of 11 of the wells range from 0.3 to 20.0 and average 4.3 gpm per ft. of drawdown. The best well tapping the Wicomico formation is QA-Cf 59 at Price. The well yielded about 200 gpm when tested in 1955.

Hydrologic coefficients

Barclay test.—On May 10, 1956 a brief aquifer test was conducted on the Wicomico formation at Barclay, Queen Annes County, using two 4-inch diameter wells of the local fire department. Well QA-Cg 2 yielded an average of 45 gpm discharging through 100 feet of 1½-inch firehose to a nearby drainage ditch. The driller's log of well QA-Cg 1 shows yellow sand and clay from 0 to 50 feet and coarse yellow sand from 50 to 60 feet. Due to the lack of cuttings from QA-Cg 1 and -Cg 2 and of logs of nearby wells, definite geologic identification of the producing sand could not be made, nor could its total thickness or areal extent be determined. Well QA-Cg 2 is 54.2 feet deep and observation well QA-Cg 1 was reportedly 60 feet deep. Both wells are equipped with 10-foot screens. The wells are 73.5 feet apart.

The drawdown phase lasted 135 minutes and the recovery phase 60 minutes. The recovery data were considered valid for the conditions permitting analysis by the Theis nonequilibrium equation and the modified Theis straight-line method. The average coefficient of transmissibility was of the order of 100,000 gpd per foot; the field coefficient of permeability is about 8,800 gpd per foot. An artesian coefficient of storage was obtained which may indicate vertical variations in permeability as suggested by the driller's log. The measured drawdown in observation well QA-Cg 1 after 135 minutes of pumping was only 0.54 foot.

The coefficients of transmissibility and storage obtained from this relatively short test are of the order of magnitude for coefficients obtained for similar deposits at Cordova in Talbot County and Hurlock in Dorchester County. Although the results of the test are not conclusive they indicate that potentially large ground-water supplies can be obtained from this aquifer in the Barclay area.

Price test.—An aquifer test was conducted May 4 and 5, 1955 on the Wicomico formation at Price, Queen Annes County. Well QA-Cf 59 was the pumping well. Its reported depth is 54.7 feet. The well is 10 inches in diameter and has 25 feet of screen from 29 to 54 feet. The driller's log of the well shows fine sand, gravel, and clay from 0 to 23 feet, and white and yellow, medium to coarse, sand and gravel from 23 to 50 feet. From 50 to about 55 feet it shows black clay with some gray sand.

Except for a few minutes of pumping to determine pumping rate and the required orifice size, well QA-Cf 59 had not been pumped for over a month prior to the test. There were no other large-capacity wells tapping the Pleistocene deposits operating in the area.

Well QA-Cf 60, a 45-foot domestic drive point well, $1\frac{1}{4}$ inches in diameter and 313 feet distant from -Cf 59, was used as the observation well.

A 12-foot deep, hand-augered well (-Cf 62), located 50 feet from the pumped well, was equipped with a water-stage recorder and also used as an observation well. Pre-test, test and post-test water-level records were obtained from this well.

On October 28, 1955 test hole QA-Cf 61 was augered 60 feet east of well QA-Cf 59. A compact silt, sand and clay was encountered from the land surface to 8 feet, and light brown to buff-colored silty medium sand with some coarse sand and granule gravel was penetrated from 8 to 55 feet. The consistency of the wet sand samples was soupy or muddy. A gray compact peaty clay with large shell fragments was encountered from 55 to 59 feet. The hole probably ended in the Calvert formation.

Well QA-Cf 59 was pumped for 1,380 minutes at an average rate of 198 gpm. The pumping rate was determined by means of an orifice and piezometer tube. The discharge was to an open ditch comprising part of the local drainage system. Recovery measurements were made for 440 minutes. The drawdown measured at the observation well QA-Cf 60 was 2.55 feet.

Analysis of the data showed that only the drawdown and recovery periods from 7 to 32 minutes matched the Theis nonequilibrium-type curve. Drawdown after 32 minutes indicated a recharging condition. The recharge was attributed to slow drainage or downward leakage of water from overlying less permeable, silty sands. The water level in observation well -Cf 62 lowered only 0.26 foot during the period of pumping, indicating possible slow drainage from the overlying sediments. A plot of the drawdown data from the shallow well matched the Theis-type curve very well. However, the coefficients of transmissibility and storage were not in agreement with the data obtained from other wells. Based on measurements in well -Cf 60 for the initial 32 minutes of pumping and recovery, the computed coefficient of transmissibility was on the order of 30,000 gpd per foot. Data from the early part of the test indicated an artesian coefficient of storage of 0.0003. This value may be the result of vertical variations in permeability and the existence of a leaky aquifer causing recharging conditions. Tests of longer duration, preferably with two or more observation wells, would be required to obtain more reliable hydrologic coefficients. The test indicates, however, that the sediments in the Wicomico formation at Price are capable of moderate to large development.

Talbot Formation

Distribution and Lithology

The Talbot formation covers about 25 percent of the total land area of the three counties. In southwestern Kent and Queen Annes Counties it occurs as flat plains; along the Bay and estuaries in Cecil County and in part of Kent and Queen Annes Counties as terraces.

The deposits of the Talbot are, in part, of marine or estuarine and, in part, of fluviatile origin. The bottom of the formation is generally below sea level. Marine shell fragments have been found in several wells (Ken-Cd 23, Ken-Db 14, and QA-Ec 50). Near Rock Hall fragments of logs are reported from dug wells penetrating the deposits.

The formation consists essentially of sand, clay, sandy clay, silt, and gravel. The gravel layers are generally thin and fine-grained and are mixed with sand and sandy clay. Clay beds at places are much contorted and broken, due probably to the action of ground frost. Sand is generally coarse or medium grained, and is, wherever seen in place, strongly crossbedded. A good exposure of the

Talbot formation occurs in Kent County near the town of Sassafras. A description of the exposure is:

Geologic section of the Talbot Formation along Rt. 299, near the South Edge of the Town of Sassafras

Description	Thickness (feet)
Sand and gravel, coarse; crossbedded	5.0
Sand, coarse, and gravel, fine; crossbedded	5.4
Gravel, iron-cemented and boulders (one measured boulder, 1.4 feet in diameter)	.4
Sand, moderate-orange, coarse, and gravel, fine; crossbedded	4.8
Gravel, fine, darkly iron-stained	.3
Sand, moderate-orange, medium- to coarse-grained; continuous inclined bedding, beds dipping 20°–25°S	5.3
Sand, coarse, and gravel, fine; bed topped by hard dark-brown iron-cemented layer ½ inch thick	.6
Clay, weak-yellow, somewhat sandy, slightly sticky	.2
Sand, dark-orange, iron-stained, crossbedded	.5
Clay, weak-yellow, somewhat sandy, slightly sticky	.2
Sand, dark-orange, iron-stained, crossbedded; bed topped by hard, dark-brown iron layer, ½ inch thick	1.0
Sand, yellowish-gray and moderate-orange, medium coarse, crossbedded; carbonaceous material	1.2
(Base of section at altitude 10 feet)	
Total	24.9

A somewhat different section at Tolchester Beach, is:

Talbot formation at Tolchester Beach

Description	Thickness (feet)
Loam	10.0
Gravel, coarse, heavily iron-stained	1.7
Gravel, much of it coarse, poorly sorted; at base of gravel pieces of yellowish gray clay, 1 foot or more in length, contorted and broken	3.3
Sand, coarse, yellowish gray; a little fine gravel, crossbedded; upper surface very irregular; ranges in thickness from 2 feet to a few inches	2.0
Sand, iron-stained	.2
Gravel and sand, heavily iron-stained	.2
Clay, yellow-gray and yellow, wavy upper contact	.3
Clay, color-banded (reddish brown, olive gray, limonitic), ⅛-inch limonite band on top; thickness of color bands, under 1 inch	2.2
Concealed, but probably clay	.5
Concealed to water level	5.0
(Base of formation probably below sea level)	
Total	25.4

Table 29 shows that in the three counties about 47 percent of the formation consists of sand and gravel, about 30 percent of clay, and about 23 percent of sandy clay. The formation contains the largest amount of sand and gravel in Cecil County, less in Queen Annes County and least in Kent County. At most places a thin gravel bed at the base serves as a marker bed separating the Pleistocene from the underlying deposits.

In Cecil County the deposits occur chiefly as terraces. Sand and gravel deposits are common in the terraces. In Kent County and Queen Annes County they occur as featureless plains. The character of the deposits in Kent County suggests an environment of deposition less disturbed by currents than that in Queen Annes County.

TABLE 29

Lithologic Types in the Talbot Formation

County	Total footage	Percent clay	Percent sandy clay	Percent sand and gravel
Cecil	458	18	21	61
Kent	867	42	30	28
Queen Annes	2,727	30	19	51
All counties	4,052	30	23	47

Thickness

The average thickness of the Talbot formation is about 40 feet.

Water-bearing Properties

The Talbot formation is a fairly good aquifer. In Kent and Queen Annes Counties it crops out over broad areas where it is recharged directly from local precipitation. However, the well inventory showed relatively few wells that yield water from the Talbot formation. In Cecil County 14 wells were canvassed which obtain water from the Talbot formation. All reportedly yielded water that tastes of iron. In Kent County 62 wells were canvassed which produce from the formation. Most yield water of good quality but several yield water that tastes of iron or with a swampy taste. Near Rock Hall wells tapping the Talbot formation are said to yield water of poor quality. In Queen Annes County 13 wells were inventoried which tap the Talbot; about half yielded water of good quality, and the rest water unfit for use. The high iron content and acidic character of the water, however, might not preclude its use for purposes other than domestic. The water, unless brackish, might be useful for irrigation, for stock and for other uses. Generally, however, the users of small amounts of ground water do not want to set up two separate systems and prefer drilled wells tapping aquifers which yield water of a more desirable chemical character.

Most of the wells which tap the Talbot formation are dug and driven wells which provide little or no data on the water-bearing properties of the formation. However, the yields of 6 wells, for which these data are available, range from 12 to 40 gpm and average 24 gpm. The best well, Ken-Cb 31 near Tolchester Beach, yields 40 gpm from a 13-foot bed of boulders and gravel at the base of the formation. The well is 6 inches in diameter, contains 10 feet of slotted screen, and had a specific capacity of 10.0 gpm per ft. of drawdown. The water from this well is exceptionally high in iron content (38 ppm) and is mildly acidic (pH 5.6). The specific capacities of 6 wells in the formation range from 0.6 to 10.0 and average 3.8 gpm per ft.

Two springs were inventoried which issue from the formation. One of these, Ce-Ce 44 along the Elk River, flowed an estimated 10–15 gpm in December 1953.

Hydrologic coefficients

Elkton test. The Bay Shore Industries plant is located 1.5 miles northwest of the center of Elkton on the north side of the Little Elk River. On October 15, 16, and 17, 1956, wells Ce-Be 21, -Be 23, and -Be 24 at this plant were pumped by a portable gasoline centrifugal pump at an average rate of 52 gpm. Measurements of drawdown and recovery of the water levels were made. The wells were hand dug in 1942, cased with wooden planks and lined with uncemented bricks. Well screens had been made by boring holes $\frac{1}{8}$-inch in diameter at regular intervals through the wooden casing. The wells are approximately 84 inches in diameter and are 20, 37, and 19 feet deep, respectively. The location and logs of the wells are shown in figure 10. These wells and five others of the same type are on a flood plain terrace of the Little Elk River about 5 feet above the river surface at the time of the test. The sediments logged in wells Ce-Be 21, -Be 23, and -Be 24 to a depth of about 20 feet are probably of Pleistocene age. The elevation of the water surface in Little Elk River and of the water levels in the wells was approximately the same. However, with the land elevation to the north and west of the river about 80 feet above the level at the test site, it can be assumed that unconfined ground water moves toward the topographically lower river level.

Wells Ce-Be 21, 23, and 24 were equipped in 1942 with 15 horsepower deep-well turbine pumps of about 150 gpm capacity. Reportedly some of the wells could only be pumped for 1 to 2 hours before the pumps began to suck air. Prior to the test the wells had not been pumped for over a year.

Well Ce-Be 21 was pumped for 91 minutes and recovery measurements made for 420 minutes; well -Be 23 was pumped for 101 minutes and recovery measurements made for 360 minutes; well -Be 24 was pumped for 150 minutes and

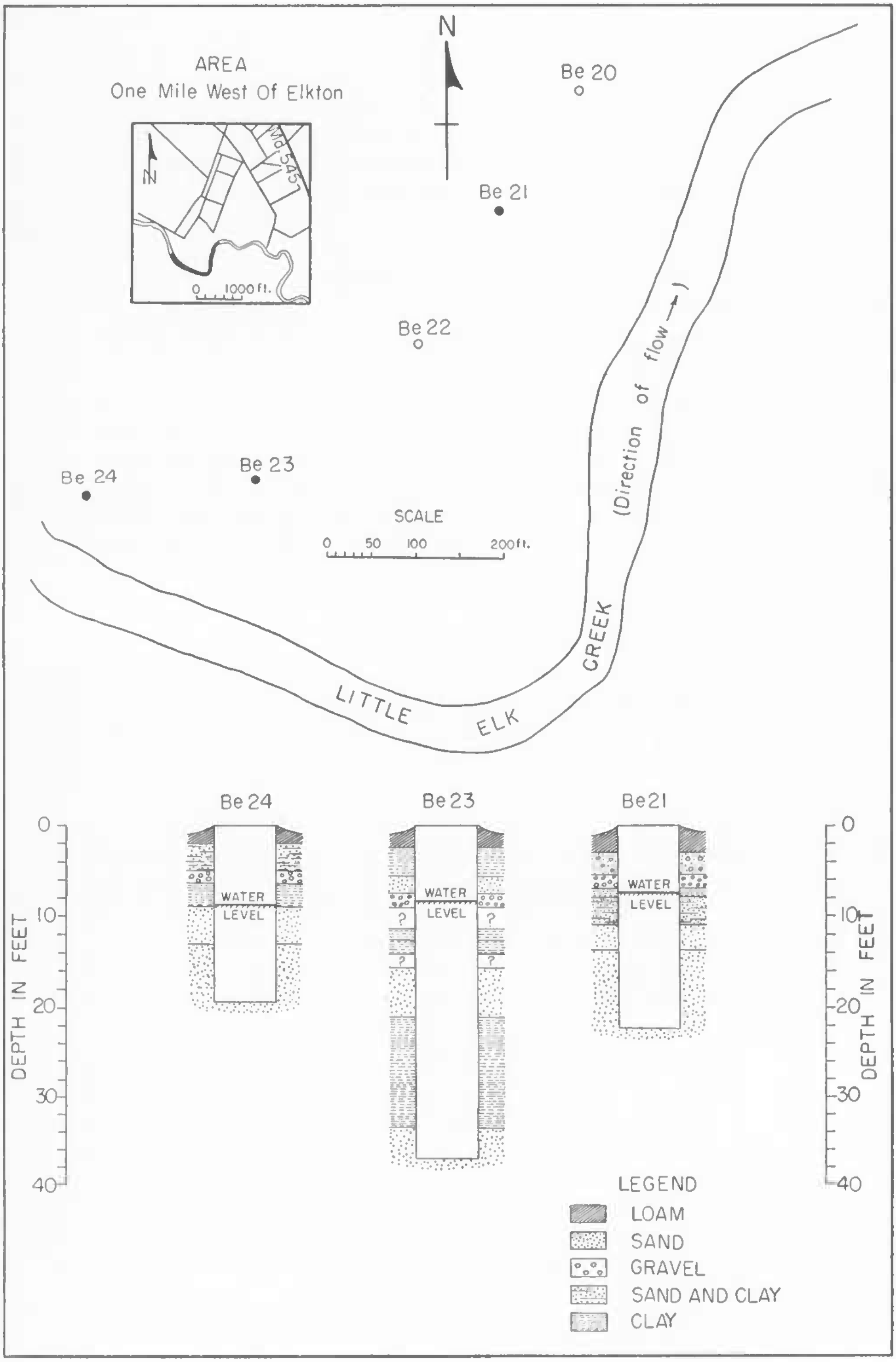

FIGURE 10. Map and Logs of Dug Wells at the Bay Shore Industries Plant near Elkton

recovery measurements made for 150 minutes. The water was discharged 75 feet away through a $1\frac{1}{2}$-inch hose. The general ground surface condition was semi-marshy, with a few ponded areas indicating a rather impervious subsoil.

Drawdown and recovery graphs showed the wells to be very similar in performance.

Recovery curves from the tests, using the Theis formula, indicated transmissibility coefficients of 800, 900, and 1,700 gpd per foot for wells Ce-Be 21, -Be 23, and -Be 24, respectively, which are very low values for sand aquifers of Pleistocene age. During the pumping of the wells it became apparent that the intake area of the wells was principally from the bottom of the casing. The use of the Theis formula is predicated upon radial flow toward the well and screening opposite the producing sands. These limitations are violated by the design of the dug wells. Therefore, coefficients of transmissibility based on a test of a well of this type cannot be held strictly valid.

The tests indicate that the shallow, alluvial sands of Pleistocene age at this locality will yield only moderate quantities of water, even to properly constructed large-diameter wells.

QUALITY OF WATER

The quality of ground water is determined chiefly by the amount and character of the material dissolved in it. Precipitation, the primary source of ground water, contains only a very small amount of dissolved material, chiefly dust and gases. The gases are, however, important because some of them, especially carbon dioxide, make the water chemically active. When the water sinks beneath the land surface, it reacts with the soil and rock minerals and with organic material. Organic acids further activate the water. The most noticeable effect the water has on the rock is weathering. In the process of weathering the percolating water dissolves some of the mineral matter which is carried underground where further reactions with other rocks and minerals take place. The farther the water moves through the rock the more heavily laden with soluble minerals it is likely to be. Although the amount of mineral matter dissolved in the ground water of the tricounty area is small, it is important in determining the quality and usability of the water.

Before discussing the chemical character and composition of the waters associated with the different formations in the tricounty area, a brief explanation is given of the constituents that are determined in a chemical analysis of water.

Some of the analyses in Table 44 are more comprehensive than others. Most of these analyses were made by the Water Resources Division of the United States Geological Survey. Other analyses were obtained from the files of the Maryland State Department of Health. Two analyses were made by a commercial chemist.

The amounts by weight of the constituents are expressed in parts per million in solution in water. One part per million means there is one gram of the constituent in one million grams of water. The pH and the conductance, however, are expressed in other units.

Dissolved Solids

The dissolved solids is the dried residue on the evaporation of a clear sample of the water. It represents the matter in solution. The analyses in Table 44 made by the Department of Health show total solids, i.e., dissolved solids plus solids in suspension in the sample.

The dissolved-solids content of water from wells in the tricounty area is generally low. Water that has a content of less than 500 parts per million is satisfactory for most purposes. The minimum reported in samples analyzed by the Geological Survey was 23 ppm from well Ce-Be 18 and the maximum was 698 ppm from well QA-Db 10. The median dissolved-solids is about 131 ppm.

True color in water is that due to substance in solution. Apparent color is due mainly to matter in suspension. Turbid water may be caused by suspension of precipitated iron oxide or by clay or silt in the water, and may appear to be of various colors.

Hardness

The analyses give the total hardness and the noncarbonate hardness. By subtracting noncarbonate hardness from total hardness, carbonate hardness is obtained. The carbonate hardness of water can be removed in large part by boiling; noncarbonate hardness cannot. Carbonate hardness is due to the presence of calcium and magnesium carbonates or bicarbonates; noncarbonate hardness is due chiefly to sulfate and chloride salts of calcium and magnesium.

The chief objection to hard water is that it requires more soap to form lather than soft water and that it forms scale that clogs water pipes.

The classification of water according to hardness used in this report is:

Soft	0–60 parts per million
Moderately soft	61–90 " " "
Moderately hard	91–120 " " "
Hard	121–180 " " "
Very hard	181 plus

Hardness is frequently expressed in grains per gallon. One grain is equivalent to 17.1 parts per million.

Ground water in the tricounty area is soft to very hard, depending on the formation from which it is derived. The minimum hardness determined was 4 ppm from well Ken-Ad 5 and the maximum was 403 ppm from well QA-Db 10.

Hydrogen-Ion Concentration

The hydrogen-ion concentration, expressed as pH, is a measure of the hydrogen-ion activity of the water. The neutral point on the pH scale is 7.0.

Waters that have a pH of less than 7.0 are in the acid range of the scale; those of more than 7.0 are in the alkaline. The pH value of water is a useful index of its corrosiveness. Acid ground water may cause corrosion of well casings and of pipes in the distribution system. Corrosion is brought about by many conditions, but increases with increasing acidity of the water. The pH values indicate none of the ground waters are extremely acid or alakline. The lowest pH determined was 5.0 in well Ce-Bd 23 and the highest was 8.0 in well Tal-Af 5.

Silica (SiO_2)

Silicon is the second most abundant element in the earth's crust, and a relatively high proportion of silica is found in ground waters. It is taken into solution on the breakdown by weathering of the many rock-forming silicate minerals. Silicon is generally combined with oxygen, as the dioxide, silica, and occurs chiefly as the mineral quartz. Silica in ground water is thought to be mainly in suspension as a colloid. Although the amount of silica may be high in proportion to the other constituents, the actual silica content is not particularly high in the ground water from this area. The silica content may have little or no relation to the content of dissolved solids. It is mainly dependent on the character of the rocks. Silica offers no special problems in the use of the water. It ranges from 3.2 ppm (Ce-De 7 near Chesapeake City) to 51 ppm (Tal-Af 5 at Queen Anne).

Iron (Fe)

Iron is the most objectionable of the chemical elements in the waters of the tricounty area. It discolors the water and gives it a bad taste; it stains laundry, sanitary fixtures, and glassware; it forms scale and clogs pipes; and it reduces the capacity of storage tanks by filling them with the precipitates of iron oxide and hydroxide.

The iron in the natural waters is derived from the breakdown of iron-bearing minerals in the rocks—from iron sulfides and silicates in the igneous rocks and the schists, from iron oxides and bog iron ores in the continental deposits, and from glauconite in the marine deposits.

Thd U. S. Public Health Service has set a maximum of 0.3 ppm of iron and manganese together which preferably should not be exceeded in waters used on interstate carriers. Water containing more than 0.3 ppm iron commonly forms a reddish-brown precipitate on exposure to the air. The analyses of water from wells in the tricounty area show that most of them contain excess iron. However, some of the iron reported in the analyses may be derived in part from the well casing and from pipes and tanks through which the water moves. Much of the water of the area is treated to reduce its iron content.

The iron content of the ground water in the Coastal Plain ranges from 0.01

ppm (Ken-Ad 20) to 38 ppm (Ken-Cb 31). The iron content of the ground water from the Piedmont area ranges from 0.10 (Ce-Ac 66) to 3.5 ppm (Ce-Bd 24).

Sodium (Na) and Potassium (K)

These two elements are closely associated in their chemical properties and to some extent in their occurrence. They are found in nearly equal amounts in the rocks of the earth's crust. Sodium is abundant in sea water and in the water of some lakes. Feldspar minerals in igneous rocks contain both sodium and potassium and are the primary source of the elements in ground water issuing from those rocks. In strata of marine origin sodium and potassium are found in the mineral glauconite which is abundant in the rocks of the area. Sodium also may be present as chlorides in connate water, that is, sea water deposited with the sediments and retained in them. Sodium may also get into fresh water aquifers by invasion of salt water from the sea as a result of overpumping, through leaky wells, or by other means.

Clay minerals have the power to absorb potassium to the exclusion of sodium. This property of clay partly explains the fact that sodium is generally more abundant in water than potassium.

In the Piedmont the sodium content of the ground water ranges from 2.2 (Ce-Aa 9) to 23 ppm (Ce-Ab 26); sodium and potassium together (calculated as sodium) ranges from 2.6 ppm (Ce-Aa 9) to 33 ppm (Ce-Ab 26). In the Coastal Plain the sodium content ranges from 2.5 (Ce-Cc 33, Ce-Df 11, and Ken-Be 5) to 85 parts ppm (QA-Fa 39); sodium and potassium together ranges from 2.9 ppm (Ce-Cc 33) to 91 ppm (QA-Fa 39).

The mineral glauconite has a property, called "ion-exchange capacity," that is of practical value in modifying the chemical character of a water. Ion exchange is the ability to exchange one ion for another—for example, sodium ions for calcium ions in the water with which the greensand is in contact. In this case the rocks act as a water softener. The effects of glauconite as a water softener were not, with one possible exception, noted in the ground water of the area. Additional analyses of water from the glauconite-bearing beds would undoubtedly show more clearly that this process is taking place.

Calcium (Ca) and Magnesium (Mg)

Calcium and magnesium are very closely associated in their chemical properties and are frequently found together in nature. In ground water percolating through igneous rocks and schists, the calcium and magnesium are derived from the breakdown of calcium and magnesium minerals. Ground water from serpentine rocks is especially high in magnesium. In water from the sedimentary rocks these elements are derived from the solution of limestone, dolomite, and marl. The carbonates of these elements are only slightly soluble in pure water, but the addition of carbon dioxide to the water from the air or from the soil makes them much more soluble. The bicarbonates of these elements are the primary source of hardness in the ground water of the area. The calcium content in the ground water from the Piedmont ranges from 5.6 (Ce-Ab 26) to 14 ppm (Ce-Bd 19, -Bd 24), and the magnesium content from 0.2 (Ce-Ac 66) to 9.2 ppm (Ce-Aa 9). An anomalous water from the serpentine rocks had a magnesium content of 41 ppm (Ce-Ab 26). In the Coastal Plain aquifers the calcium content ranges from 0.3 (Ce-Bd 23) to 136 ppm (QA-Db 10); and the magnesium content from 0.04 (Ce-Bd 23) to 33 ppm (QA-De 12). The average calcium content is 19 ppm.

Fluoride (F)

Fluoride is present in the waters of the area in small amounts and is significant in ground water because of its physiological effects on the teeth of young children. If more than 1 to 1.5 parts per million is present in water, its continued use during the period of calcification of the teeth may cause mottling of the enamel. On the other hand, a fluoride content up to 1 ppm in the water appears to lessen the incidence of tooth decay (Dean, 1936).

The content of fluoride in the water in the tricounty area is low. In the Piedmont it ranges from 0.0 to 0.1 ppm in five wells, and in the Coastal Plain from 0.0 in numerous wells to 1.1 ppm in well QA-Fa 39. The average is 0.2 ppm.

Carbonate (CO_3) and Bicarbonate (HCO_3)

On the basis of 42 determinations, the carbonate (CO_3) content of ground water in the tricounty area is zero. The bicarbonate (HCO_3) content in 42 analyses ranges from 4.6 (Ken-Ad 5) to 290 ppm (QA-Ec 83).

Sulfate (SO_4)

The iron sulfides pyrite and marcasite are common rock minerals. These minerals decompose under the oxidizing conditions of weathering and form iron salts. These salts are the primary source of sulfate in the natural ground waters. In heavily fertilized localities, sulfate may percolate down to the zone of saturation from the inorganic fertilizers. Iron sulfide is particularly abundant in the Magothy, Matawan, and Monmouth formations.

The U. S. Public Health Service standards recommend that the content of sulfate in potable water not exceed 250 parts per million. The analyses of the ground water from the tricounty area show that the sulfate content approaches this figure in only one sample (well QA-Db 10), in which it is 216 ppm. The minimum sulfate content is 0.0 ppm (Ken-Cb 31 and -Cd 2).

Phosphate (PO_4)

Phosphate occurs in extremely small amounts. In 33 determinations the phosphate content ranges from 0.0 in numerous wells to 1.0 ppm (QA-Bg 43).

Chloride (Cl)

Chloride in the ground water may come from various sources. It occurs in small amounts in igneous rocks. It occurs in connate waters in marine deposits. It is present where fresh-water aquifers are contaminated with sea water. It occurs as a result of decomposition of organic matter in the soil or in soil polluted by sewage. When chloride is present in ground water in more than an amount normal for the area, efforts should be made to find its source before a serious contamination problem arises.

The U. S. Public Health Service standards recommend that the chloride content not exceed 250 ppm in potable water. Most well waters from the tri-county area contain less than 25 ppm of chloride. The minimum chloride content is 0.7 ppm (QA-Bg 43) and the maximum is 80 ppm (QA-Db 10).

Nitrate (NO_3)

The nitrate content of natural ground water is generally low. A high nitrate content suggests pollution by organic materials. In a farming community where nitrate fertilizers are used, some of the nitrate may enter the zone of shallow ground-water circulation. It is reported (American Water Works Assoc., 1950) that high nitrate concentrations (50 ppm) appear to be the cause of metheglobinemia in infants (a modification of the hemoglobin in the blood causing blueness of the skin ("blue baby disease") and other effects). Several analyses show more than 10 ppm of nitrate, and an analysis from well QA-De 12 shows 260 ppm, which is the maximum. The minimum nitrate content is 0.0 ppm (Ce-Bd 63).

Carbon dioxide (CO_2)

Carbon dioxide gas dissolved in meteoric water makes the water more active chemically. Distilled or CO_2-free water does not readily dissolve limestone, whereas water in which carbon dioxide is present does. Carbon dioxide gets into the water principally from the air, from decaying organic matter in the soil, and from minerals in the earth. It tends to decrease in amount with depth from the surface, for it is used up chemically as the CO_2-rich water attacks the rocks and forms relatively insoluble precipitates. Combined carbon dioxide is present in the water in the form of bicarbonate ions (HCO_3). Analyses of 36 samples show a range in CO_2 content of from 2.6 in three wells to 141 ppm (Ken-Cb 31).

Minor Constituents

Aluminum, although the most abundant of the metallic elements in the crust of the earth, is generally absent as a dissolved mineral constituent of ground water or present only in very small amounts. The aluminum content (Al) in 52 samples ranges from 0.0 ppm in several wells to 3.8 ppm in well Ken-Db 35 at Rock Hall. Manganese, zinc, copper, and lithium are present in some of the waters, but only in small amounts. Manganese content (Mn) in 41 analyses ranges from a trace in several wells to 0.38 ppm in well Ce-De 7 at Hack Point. Copper content in 33 analyses ranges from a trace to 0.67 ppm in well Ken-Bf 9 near Elkton.

Specific Conductance

The specific conductance of water is a measure of its ability to conduct an electric current under standardized conditions. This property depends chiefly on the presence of ionized mineral matter in the water. The ease of conductance increases with the number of ions in solution. The conductivity is, therefore, a rough measure of the dissolved solids.

Methods of Expression of Chemical Character of Water

Chemical analyses of water show merely the weights in parts per million of the various constituents in solution. The water may, however, be treated as a chemical system of dissolved salts (Palmer, 1911, p. 7). The materials in solution are in the form of ions of elements or radicals which carry positive or negative charges of electricity. The principal positive, or metallic ions, are calcium, magnesium, sodium, and potassium; and the principal negative, or acidic ions, are carbonate, bicarbonate, sulfate, chloride, and nitrate. Iron, aluminum, and silica are considered to be present chiefly in the colloidal state. The results of analyses can be expressed in terms of equivalents or combining weights of the ions by dividing the weights of the substance in parts per million by the equivalent combining weight of the ion. The sums of the equivalents of the basic ions and of the acidic ions will be approximately equal if the analyses are accurate.

The relationships of some of the waters analyzed from the tricounty area are expressed graphically in figures 11, 12, and 13. The diagrams are divided into four squares. Waters whose analyses plot in the upper half of the diagram have a higher percentage of sulfate, chloride, and nitrate, those in the lower half, of bicarbonate. Those that plot to the left of the vertical center line have a higher percentage of sodium and potassium; those to the right, of calcium and magnesium. Waters from wells having a high percentage of calcium, magnesium, and bicarbonate, such as Ae 18 and Bf 1 are calcium magnesium bicarbonate waters, and water from well Af 20, high in sodium and potassium and bicarbonate, is a sodium bicarbonate water (fig. 12). The analyses of water from a number of wells plot near the dividing lines and cannot be neatly classified in this manner.

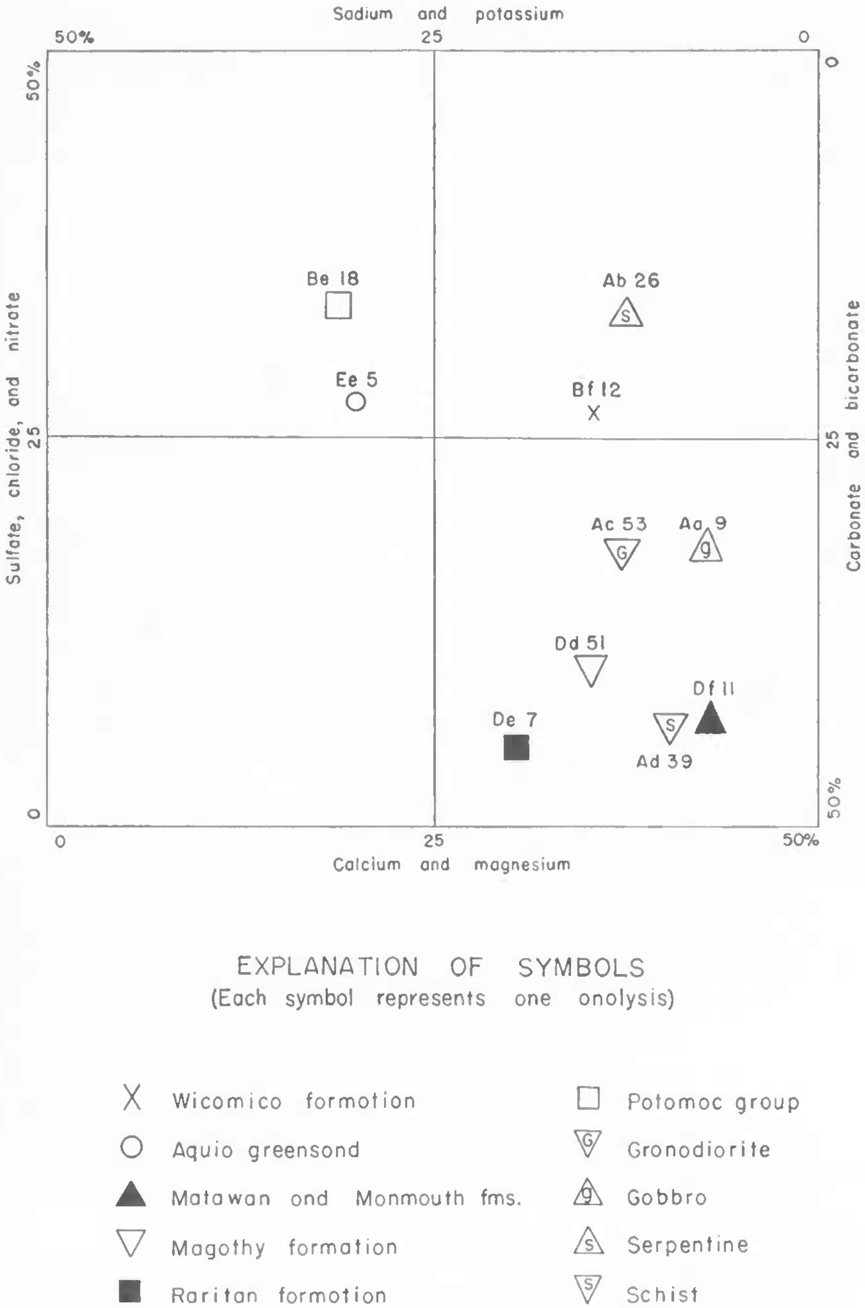

FIGURE 11. Diagram showing by Percent Reacting Value the Chemical Character of the Ground Water of Cecil County

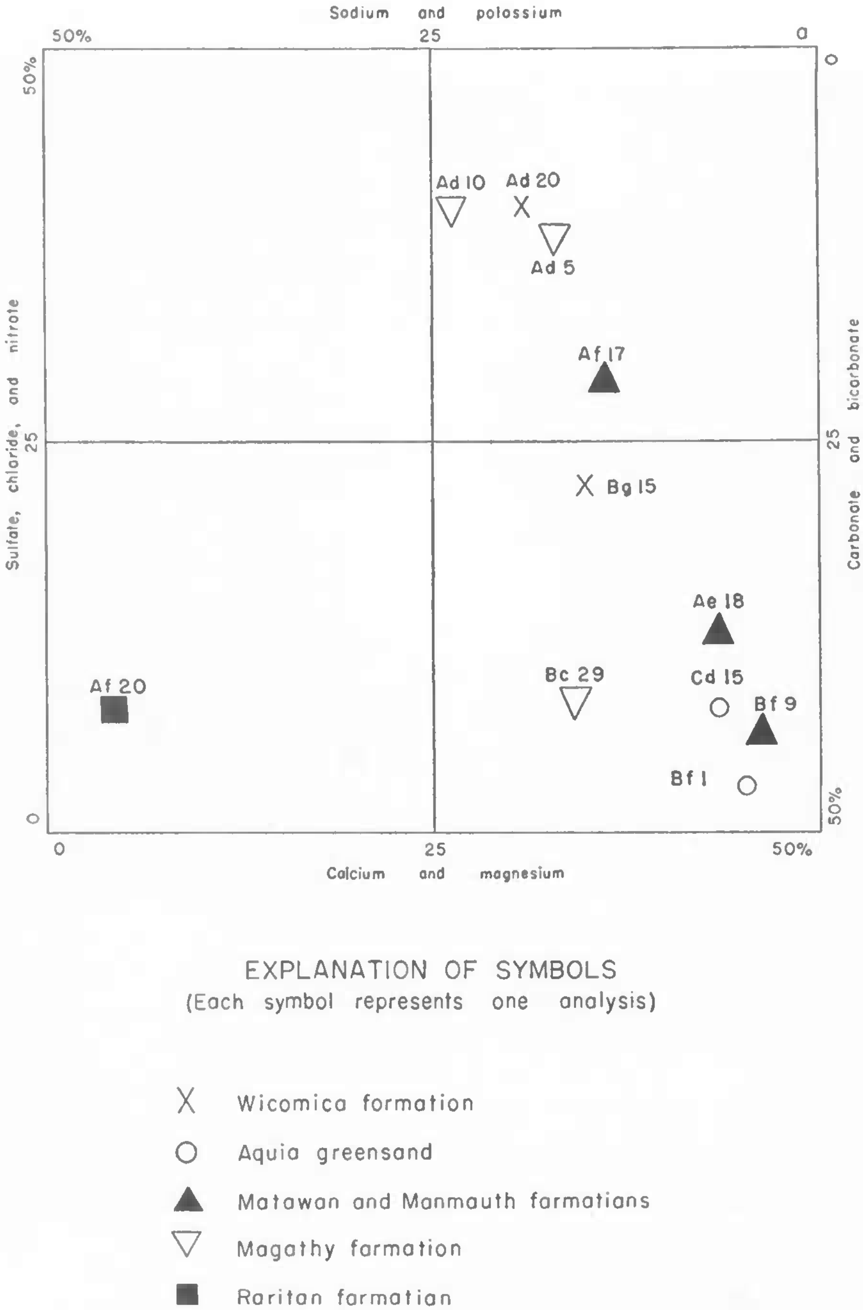

FIGURE 12. Diagram showing by Percent Reacting Value the Chemical Character of the Ground Water of Kent County

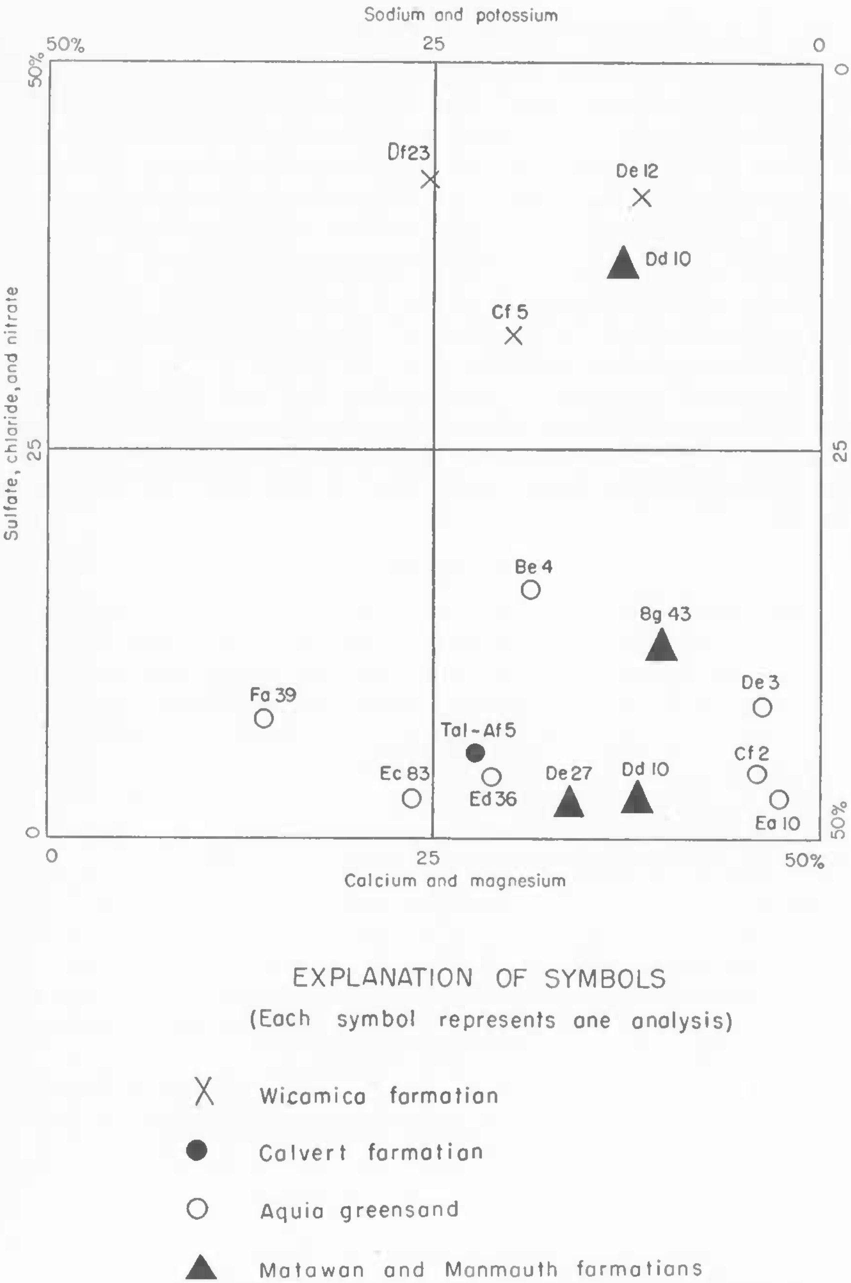

FIGURE 13. Diagram showing by Percent Reacting Value the Chemical Character of the Ground Water of Queen Annes County

Chemical Character of Water in the Aquifers

The relationship between the quality of water and the formation from which it comes is complex owing largely to the mobility of water. In its journey underground water comes in contact with many rocks and picks up constituents from each. This is particularly true for water from the crystalline rocks which moves along fissures cutting across different rock types. In the Coastal Plain deposits ground water of mixed character is common because of vertical leakage from one formation into another. Mixing of water may occur because of leaky or imperfectly sealed well casings or because a well is yielding water from more than one aquifer. In spite of these complicating factors, in many places waters from the same formation are similar.

In addition to the laboratory analyses, many field tests of the ground water were made for iron, hardness, and pH. Although these tests lack the precision of laboratory chemical analyses, they show approximately the amount of iron, hardness, and pH of the water—qualities that are of practical interest to water users.

Crystalline Rocks

In general, the waters from wells in the crystalline rocks are low in minera content and satisfactory for most uses. An exception is water from serpentine. Thus the water from well Ce-Ab 26 in serpentine is fairly high in dissolved solids (321 ppm) and in magnesium, sodium, sulfate, chloride, nitrate, and hardness. High dissolved solids, magnesium, and hardness is expected in water from serpentine, a rock high in unstable magnesium minerals, but high sulfate (40 ppm), chloride (26 ppm), and nitrate (81 ppm) suggest pollution of the water. All the waters are calcium-magnesium bicarbonate waters (fig. 11).

Field tests (Table 30) show that the serpentine wells yield the hardest water, averaging 160 ppm, and the granodiorite wells the softest, averaging 34 ppm.

Iron content of ground water from the crystalline rocks ranges from 0.0 to 4.5 ppm and averages 0.3 ppm. Although the occurrence of ground water high in iron content is irregular, the iron content of the samples of water from gabbro is the lowest. Half of the samples showed no detectable iron content by the field test method.

Most of the ground water from the crystalline rocks is slightly acidic, except from the wells ending in serpentine for which the median pH is 7.5. For the rest of the analyses the median pH is 6.7.

Patuxent and Patapsco Formations

The analyses of water from the Patuxent and Patapsco formations (Tables 31 and 44), compared with those of water from the crystalline rocks, show lower concentrations of dissolved solids, silica, calcium, and nitrate, and somewhat higher concentrations of sulfate and chloride. The water is very soft to soft

TABLE 30

Field Tests showing Iron, Hardness and pH of Water in the Crystalline Rocks

(in parts per million, except pH)

Well	Rock Type	Iron	Hardness as $CaCO_3$	pH
Schist				
Ce-Aa 15	Dug	0.2	50	7.0
Af 7	Dug	4.5	50	6.5
Ac 12	Drilled	.0	30	7.3
Ad 3	Drilled	.8	150	6.8
Af 23	Drilled	.0	30	7.0
Bb 25	Drilled	.1	70	6.5
Granodiorite				
Ad 16	Dug	.0	50	6.7
Ae 28	Dug	.1	50	6.5
Af 14	Dug	.8	20	6.5
Ae 21	Spring	.0	30	6.5
Ac 2	Drilled	.1	30	7.7
Ac 38	Drilled	.0	50	7.5
Ac 53	Drilled	.0	30	7.2
Ae 6	Drilled	.1	30	6.5
Bd 9	Drilled	.1	30	6.5
Be 54	Drilled	.2	20	7.0
Granodiorite-Gabbro Contact				
Ae 15	Dug	.0	30	6.7
Gabbro				
Ac 35	Dug	.0	90	6.5
Ac 65	Dug	.2	30	6.0
Aa 7	Spring	.0	90	7.0
Ac 36	Spring	.0	90	6.7
Aa 8	Drilled	.0	30	6.9
Aa 9	Drilled	.0	80	7.0
Metadacite				
Bc 12	Drilled	2.0	20	6.3
Serpentine				
Aa 16	Dug	.0	150	7.8
Ad 7	Dug	.2	190	5.5
Aa 17	Drilled	.2	120	7.5
Ab 26	Drilled	.0	200	7.5
Average all wells		0.3	70	6.8[a]

[a] Median value

and has a pH range of 6.0 to 7.3. The iron content is much higher. The public supply well (Ce-Cf 2) at Chesapeake City is reported to contain at times as much as 40 parts per million of iron.

Raritan Formation

Since the rocks of the Raritan formation are similar to those of the Potomac group, one would expect the water analyses to be similar. This is true, generally, but the ground water from the Raritan formation is higher in sodium, and in well Ce-Cf 18 near Chesapeake City it is relatively high in sulfate (27 ppm).

Field tests (Table 32) show the waters of the Raritan are higher in iron,

TABLE 31

Field Tests showing Iron, Hardness, and pH of Water in the Patuxent and Patapsco Formations

(in parts per million, except pH)

Well	Location	Iron	Hardness	pH
Ce-Bd 26	North East	7.5	20	6.5
Be 18	West Elkton	2.0	20	6.5
Bf 41	Elkton	.2	70	7.2
Cd 2	Northeast Heights	1.0	20	7.0
Cd 7	Elk Neck	.4	20	6.0
Cd 11	do	.8	20	6.0
Cf 28	Chesapeake City	9.0	20	7.3
Cf 31	do	9.0	30	7.3
Average		3.7	30	6.7[a]

[a] Median value.

harder, and higher in pH than the waters from the Potomac group. Comments of owners of wells in Crystal Beach Manor indicate a rather wide range in the amount of iron in the water. The average value of the iron content determined by field methods is 4.6 ppm; the average hardness is 70 ppm, and the median pH is 7.3.

Magothy Formation

The Magothy formation is rather thin, and as a result its water reflects to a degree the influence of the neighboring formations. At places the lower portion of the formation is connected hydrologically with the Raritan formation and its upper part with the Matawan formation.

The water analyses (Table 44) show considerable variation. Concentrations of dissolved solids range from 23 to 238 ppm; iron is high, as in the adjacent formations. High nitrate (33 ppm) in the water from well Ken-Ad 10 suggests

TABLE 32

Field Tests showing Iron, Hardness, and pH of Water in the Raritan Formation

(in parts per million, except pH)

Well	Location	Iron	Hardness	pH
Ce-Dd 35	Crystal Beach	6.0	30	7.0
De 3	Hack Point	8.0	70	7.5
De 7	do	7.5	70	7.5
De 9	do	1.5	100	7.5
De 16	do	6.0	70	7.5
De 24	do	1.5	90	7.3
De 25	do	.3	90	7.0
De 40	do	7.5	50	7.5
Ken-Ac 16	Howell Point	3.0	70	6.5
Average		4.6	70	7.5[a]

[a] Median value.

TABLE 33

Field Tests showing Iron, Hardness, and pH of Water from the Magothy Formation

(in parts per million, except pH)

Well	Location	Iron	Hardness	pH
Ce-Dd 51	Crystal Beach	9.0	80	7.5
De 1	Hack Point	8.0	80	8.0
De 2	do	8.0	30	7.3
De 4	do	2.0	50	7.0
Ken-Ad 2	Betterton	.5	30	7.0
Ad 5	do	4.0	20	6.5
Ad 6	do	2.0	80	6.5
Ad 9	do	.9	50	6.0
Ad 12	do	.6	20	6.5
Ad 32	do	4.0	40	7.0
Ad 38	do	.3	50	6.5
Ae 4	Kentmore Park	.2	90	8.0
Bc 29	Hanesville	10.0	30	7.5
Average		3.8	50	7.0[a]

[a] Median value.

contamination by organic matter or fertilizer. The water is very soft to moderately hard.

Field tests (Table 33) of water from the Magothy show fairly high iron content, ranging from 0.2 to 10 ppm. It is commonly soft to moderately soft, and has a pH range of 6.0 to 8.0. The pH values are somewhat lower in the Betterton area than elsewhere.

Matawan and Monmouth Formations

The analyses of the water from these formations are grouped together because no significant differences could be found between them. The analyses (Table 44) show that shallow wells in the outcrop area of the formations yield

TABLE 34

Field Tests showing Iron, Hardness, and pH of Water in the Matawan and Monmouth Formations

(in parts per million, except pH)

Well	Location	Iron	Hardness	pH
Ce-Df 11	Bohemia Mills	0.5	120	8.3
Ee 9	Cecilton	.7	120	8.5
Ee 12	do	1.0	170	8.5
Ken-Ae 18	Kentmore Park	1.5	90	7.5
Ae 26	do	.5	130	7.5
Af 1	Galena	.6	140	8.0
Af 15	do	.1	140	6.5
Af 17	do	.2	120	7.3
Be 5	Kennedyville	1.0	190	8.0
Be 19	do	1.3	150	8.3
Be 20	Chesterville	2.0	120	8.3
Bf 6	do	4.0	140	8.3
QA-Bg 41	Sudlersville	1.0	200	8.5
Bg 43	do	4.0	120	8.0
Average		1.3	140	8.0[a]

[a] Median value.

water less mineralized than that from deeper wells. The shallower wells have softer water than the deep wells. The concentration of fluoride is higher in the waters from these deposits and from the other marine deposits than from the nonmarine deposits. Of 16 analyses that show more than 0.1 ppm fluoride, 12 are analyses of water from the marine deposits.

The analyses of water from the formations of marine origin show a greater range in dissolved solids, are higher in silica, calcium, and hardness than the analyses from the formations of continental origin. The water from the continental deposits is higher in iron and sulfate.

Field tests (Table 34) show that the ground water from the Matawan and Monmouth formations is intermediate in iron content and is hard. All the samples tested except one were in the alkaline range of the pH scale. The average iron content, 1.3 ppm, is somewhat lower than that from the Magothy formation. The water from the Matawan and Monmouth formations is more alkaline (pH range 6.5 to 8.5) and is harder (average 140 ppm) than that from the Magothy (average 50 ppm).

Aquia Greensand

The analyses show that the ground water from the Aquia greensand contains less iron that that from the Matawan and Monmouth formations and is a little less hard. Concentrations of dissolved solids range from 58 to 698 ppm. The samples with low dissolved solids are from wells in or close to the outcrop area of the formation. Those with high dissolved solids are from deep wells. The waters are higher in calcium than those of the Matawan and Monmouth formations, owing probably to the numerous shell beds in the Aquia greensand. They are low in sodium except for wells QA-Fa 39 (85 ppm), QA-Db 10 (45 ppm), and QA-Ec 83 (41 ppm). There is no obvious explanation for the relatively high sodium in these wells.

Field tests (Table 35) show the iron content ranges from 0.1 to 6 ppm, the hardness from 20 to 460 ppm, and the pH from 6.0 to 8.3. The median value for pH is 8.2.

Calvert Formation

Analyses of water from the Calvert formation are available only from wells QA-Cf 5 at Price and Tal-Af 5 at Queen Anne. Well QA-Cf 5 also produces water from the Wicomico formation. The iron content of both samples was low, 0.04 and 0.17 ppm, respectively. The water from the well at Queen Anne was moderately hard, 100 ppm, and had a pH value of 8.1. The high silica content (51 ppm) of the water might necessitate treatment if used for boiler purposes.

Wicomico Formation

Ground water in the Wicomico formation is especially subject to surface contamination. The high nitrate, chloride, and sodium content of a few samples suggests the presence of contamination. Table 36 shows iron contents ranging from 0.0 to 0.6 and averaging 0.3 ppm. Hardness ranges from 20 to 170 and averages 70 ppm. The pH ranges from 6.0 to 7.3, but only one sample is above 6.8.

Summary—Quality of Water of Formations

It is important for both the domestic and the industrial user of ground water to know its chemical character because of the extra expense involved where water treatment is required. It is not possible to predict with certainty what

TABLE 35

Field Tests showing Iron, Hardness, and pH of Water in the Aquia Greensand

(in parts per million, except pH)

Well	Location	Iron	Hardness	pH
Ce-Ec 8	Cecilton	0.2	20	6.0
Ken-Af 18	Galena	.5	30	6.5
Bf 42	do	1.0	150	8.3
Bf 1	Millington	2.0	150	8.3
Bf 11	do	2.0	150	8.3
Cd 8	Chestertown	1.4	140	8.3
Cd 9	do	1.3	100	8.3
Cd 14	do	.2	30	7.0
Cd 15	do	6.0	100	8.3
Cd 21	do	3.0	80	7.8
Cd 32	do	.2	20	6.3
Dc 2	Broad Neck	.5	70	8.0
Eb 1	Eastern Neck Island	.4	150	8.0
QA-Be 4	Kingstown	.1	70	7.5
Db 10	Love Point	4.0	460	8.0
De 3	Centreville	.5	140	8.3
Ea 10	Matapeake	.4	140	8.3
Ed 36	Queenstown	.3	100	8.2
Fa 39	Romancoke	.3	90	8.3
Average		1.3	120	8.2[a]

[a] Median value.

TABLE 36

Field Tests showing Iron, Hardness, and pH of Water in the Wicomico Formation

(in parts per million, except pH)

Well	Location	Iron	Hardness	pH
Ce-Bf 19	Holly Hall	0.1	20	6.3
Cf 39	near Chesapeake City	.2	70	6.8
Df 27	do	—	90	6.7
Ee 27	Cecilton	.2	50	7.3
Ken-Ad 20	Betterton	.0	70	6.0
Bf 24	near Chesterville	—	170	—
QA-Be 5	Kingstown	.4	20	6.8
De 12	Carville	.6	255[a]	6.8
Average		0.3	70	6.8[b]

[a] Not included in average.

[b] Median value.

kind of water may be obtained, but the probabilities can be indicated. Tables 37 and 38 qualitatively summarize the data by formations and areas. The distinction between drilled wells and dug wells in Table 38 is important because in some localities the chances of obtaining good water for domestic uses are much greater from properly constructed dug or driven wells than from drilled wells.

TEMPERATURE OF THE GROUND WATER

The temperature of the water was measured in 180 wells and springs. These measurements are only rough approximations of the temperature of the water at its source below the ground. Since wells drilled into the crystalline rocks are cased to bedrock and are open below, water may enter the well from different depths and the temperature measured at the discharge pipe may be that of a

TABLE 37

Summary of Average Iron Content, Average Hardness, and Median pH in Water from Water-bearing Formations

(in parts per million, except pH)

Formation	Iron	Hardness	pH
Wicomico	.3	70	6.8
Aquia	1.3	120	8.2
Matawan and Monmouth	1.3	140	8.0
Magothy	3.8	50	7.0
Raritan	4.6	70	7.5
Patuxent and Patapsco	3.7	30	6.7
Crystalline rocks	.3	70	6.8

composite from several zones. As drilled wells in the Coastal Plain are usually cased and screened opposite one aquifer only, the measured temperature is more closely related to the true temperature of the water in the aquifer. Wherever possible, temperatures were measured after the well had been pumped for at least 15 minutes. Even after pumping for this length of time the temperature of the water from the large-diameter dug wells may not reflect the true ground-water temperature. As shallow dug wells have a large water surface and wall area exposed to the air, the water temperature in the wells probably is modified by air temperatures.

Water from wells tapping the crystalline rocks has an average temperature of 56°F and ranges between 49°F and 65°F. The coolest water was from a 96-foot drilled well at Rising Sun (Ce-Ac 40). The warmest water was from a 195-foot drilled well at North East (Ce-Bd 18).

The average temperature of water from wells tapping deposits of Pleistocene age is 58°F. The temperature ranges from 46°F in well Ce-Cf 39 (14 feet deep)

TABLE 38

Résumé of Quality of Water by Areas

Area	Drilled wells	Dug or driven wells
	Cecil County	
Conowingo	Generally good; hard in serpentine	Generally good; hard in serpentine
Colora	Good	Good or slightly hard
Rising Sun	do	Good
Calvert	do	do
Providence	do	do
Cowentown	do	Good, or somewhat high iron
Port Deposit	do	Good
Craigtown	do	do
North East	Good in hard rock; iron taste; hard in Coastal Plain rocks	do
West Elkton	Generally good; some tastes of iron	Good
Carpenter Point	do	—
Charlestown	High in iron	—
Elk Neck-Back Creek	do	Generally good, but some high in iron
Chesapeake City	Very high iron	Generally good
Crystal Beach	Generally high iron; soft to moderately hard	—
Hack Point	High to very high iron; moderately soft to very hard	Generally good
Bohemia Mills	High in iron and very hard	Generally good; some high in iron
Grove Point	High in iron; soft	—
Grove Neck	do	Generally good
Cecilton	Varied; good to high in iron, soft to to hard	Generally good; some high in iron
	Kent County	
Howell Point	Good; some iron; soft	Few wells; iron
Betterton	Varied; some high in iron; soft	Variable, both good and iron
Kentmore Park	Varied; some iron; moderately hard	Few wells, iron chiefly
Galena	do	do
Sassafras	Few wells; iron; hard	Most wells some iron
Fairlee Neck	Few wells; high iron	Generally iron
Hanesville	High iron; soft	Generally good; some iron
Stillpond	Very few wells; high iron	Good
Kennedyville	Varied; high iron; hard	Generally good; slight iron
Millington	High iron and hard	About half good; rest high iron and hard
Massey	Varied; good to high iron, depending on depth	Good except well at Massey where water is very hard
Tolchester	Very high in iron; reports vary	Nearly all good

TABLE 38—*Continued*

Area	Drilled wells	Dug or driven wells
Langford	Only one well; high iron	Nearly all good; some iron and hard
Chestertown	Generally good, but high iron in depth	Few wells; good
Rock Hall	High in iron, up to 24 ppm; soft	Generally poor; but some good
Quaker Neck	Varied; both high iron and hard	Good
Queen Annes County		
Kingstown	Good; low iron; soft	Good; few wells
Crumpton	Varied; few wells	Good; many wells
Sudlersville	Varied; generally high iron or hard	Generally good; many wells
Peters Corner	—	do
Spaniard Neck	—	Good; few wells
Starkeys Corner	Generally good	Good; many wells
Church Hill	Generally good, but some high in iron and hard; few wells	do
Barclay	Few wells; no report of quality	Generally good; many wells
Schenk Corner	No drilled wells	Generally good; a little iron water; many wells
Love Point	High iron; very hard; few wells	No wells recorded
Brownsville	Good; some hard	Good; few wells
Centreville	Good, moderately hard	Generally good; many wells
Hope	—	Good; many wells
Matapeake	Generally good; slight iron and moderately hard	—
Stevensville	Slight iron; generally hard	—
Grasonville	do	—
Queenstown	do	—
Wye Mills	do	Good; few wells
Queen Anne	Moderately hard; few wells	Good; many wells
Romancoke	Only one well sampled, slight iron and soft	—

to 67°F in well Ce-Be 36 (13 feet deep). These values may reflect the seasonal air temperatures at the time of measurement.

The average temperature of water from wells 0 to 100 feet deep is 58°F. The temperatures range from 46°F in well Ce-Cf 39 (14 feet deep) to 70°F in well Ce-Dd 6 (84 feet deep). The average temperature of water from wells 101 to 200 feet deep is 58°F. The temperatures range from 52.5°F in well QA-Db 10 (136 feet deep) to 68°F in well Ce-Dd 34 (144 feet deep). The average temperature of water from wells over 200 feet deep is 58°F. The temperatures range from 54°F in well QA-Ed 36 (320 feet deep) to 61.5°F in well QA-Fa 48 (261 feet deep). The agreement of the average temperature (58°F) of the water from wells in the three depth intervals is probably largely fortuitous, as this is not in accord with the temperatures expected in water from the deeper wells.

Bennett found in the well waters of the Baltimore industrial area a rate of temperature increase of about 1°F per 60 feet of depth (1952, p. 173). Darton cited a well at Fort Monroe, Virginia, in Coastal Plain deposits which has a temperature increase of 1°F in 64 feet (1920, p. 88). He also noted a flowing well at Crisfield, Maryland, which has an increase of 1°F in 47.4 feet, and two wells at Atlantic City, New Jersey, having an increase of 1°F in 59 feet (p. 49, 64). These wells are either flowing or are located in heavily pumped areas. In well Tal-Cb 89 at Wades Point, Talbot County, Rasmussen and Slaughter (1956, p. 219) found the temperature gradient to be 1°F per 84 feet, to the upper aquifer at a depth of 915 to 980 feet and 1°F per 118 feet to the lower aquifer at a depth of 1,351 to 1,420 feet. The gradient in a 200-foot well (Ken-Bg 28) at Massey is about 1°F per 150 feet (Pl. 11).

A detailed temperature survey was made on four wells (Pl. 11). Three of them, wells Ken-Bg 21, -Bg 27, and -Bg 28, are at Massey in Kent County. Well -Bg 21 ends in the Aquia greensand at a depth of 99 feet. The temperature curve of October 5, 1956, shows a decrease of about 2.5°F (58°F to 55.6°F) from a depth of 18 to about 35 feet. From 35 to 99 feet the water temperature increases to 56.1°F. The bulge in the temperature curve at 30 to 40 feet may reflect a zone of cool water moving through the Wicomico formation at this depth. These wells had not been pumped for about a year prior to the taking of the temperature measurements. No other wells pump from the aquifer in the vicinity. The temperature curves of wells -Bg 27 and -Bg 28 differ from each other and the upper part of the curve of -Bg 28 resembles that of -Bg 21. Wells -Bg 27 and -Bg 28 both end in the Monmouth formation at depths of 201 and 196 feet, respectively. The temperature curve of -Bg 27 (especially on October 5, 1956) does not show the sharp reversal in the warming trend around −30 to −40 feet. The anomalous character of the temperature curves for this well is probable due to improper sealing of the casing resulting in downward movement of warm surface water from summer rains. A similar shape of the temperature curves (October 5 and 8, 1956) is shown for well Ce-Bf 56 at Elkton. The permeable character of the earth materials above the screen and the absence of a pronounced vertical temperature gradient suggest that warm summer recharge waters enter the well screen rather rapidly.

Collins states that the annual range in temperature decreases very rapidly in the first few feet (1925, p. 97–98). In Japan, for example, where the surface temperature varies 51°F, the water at 2 feet varies 34°F, at 10 feet, 9.4°F, and at 23 feet 0.7°F. He also states that under normal conditions, and at depths beween 20 and 200 feet, the water temperature will generally exceed the mean annual air temperature by 2°F to 6°F. Singer and Brown (1956, p. 746) show that the temperature at a depth of 2.5 feet extends through a range of 42.9°F and at a depth of 20 feet extends through a range of only 1°F. Their data also show that at a depth of 2.5 feet the maximum temperature occurs in July, and at a depth of 20 feet the maximum occurs in November.

The mean annual air temperature at Elkton is 54.2°F and at Millington (near Massey) 55.0°F. At Elkton the temperature of water at a depth of 72 feet exceeds the mean annual temperature by 1.1°F. At Massey the water temperature at a depth of 100 feet exceeds the mean annual temperature by 0.6°F and at 195 feet by 1.5°F. The temperature logs show that the greatest change in temperature occurs within a few feet of the water surface. For example, in well Ken-Bg 28 the temperature change is 16°F per 100 feet for the first 9 feet; the same rate of change prevails in well -Bg 21 for the first 15 feet. In well -Bg 27 the rate is 36°F per 100 feet for the first 4 feet of depth measured; and then 8°F per 100 feet for the next 30 feet of depth measured.

The average temperature gradient of the earth is generally given as about 1°F in 60 feet. If other influences were eliminated, the average theoretical increase in wells Ken-Bg 27 and -Bg 28 should be from 55°F at the surface to 58.3°F at the bottom of the wells. Actually the bottom temperature at a depth of approximately 200 feet is 56.1°F or at the rate of 1°F in approximately 150 feet. It is possible that since the water in these wells has been undisturbed for a long period of time, distribution of heat by convection currents in the water has taken place. The average temperature of 58°F given in this report as the temperature of pumping wells 200 and 300 feet deep is close to the theoretical values.

WATER-LEVEL FLUCTUATIONS

Periodic measurements were made of the depth to water in eight observation wells (Table 39). The measurements indicate the seasonal changes in water levels; and, where they extend over a period of several years, they show long-term trends in the position of the water table or piezometric surface.

Water levels are given for wells on which the information is available in Tables 45, 46, and 47. Measurements to water level were made where possible, otherwise the information supplied by well drillers was used.

The water-level changes in wells serve as a gage of the behavior of water in the ground-water reservoir. When the water level falls, more water is leaving the reservoir at the point of measurement than is entering it. When the level rises, the reverse is true. The level at which water is standing in a well at the time of measurement represents either the surface of free water of a water-table reservoir or the piezometric, or pressure surface, at the well in a body of confined water. Changes in level under water-table conditions are caused chiefly by the addition and subtraction of water to the ground-water reservoir. Changes in water level under artesian conditions result from increases or decreases in pressure in the artesian body.

The graphs in figure 14 indicate the monthly changes in water levels in five wells. Wells Ce-Bf 1, Ce-Cf 1, and QA-Ec 1 are water-table wells; wells Ken-Dc 1 and QA-Eb 12 are artesian wells. The average monthly rainfall at Elkton and Chestertown is shown also for the period 1950–1956.

The curves of the water-level changes in the water-table wells are markedly cyclic to the end of 1954. The periodicity is less clearly shown in 1955 and 1956.

TABLE 39

Observation Wells in Cecil, Kent, and Queen Annes Counties

Well number	Location	Depth (feet)	Type	Water bearing unit	Date record begins
			Cecil County		
Ce-Bf 1	Iron Hill	71	water-table	Crystalline rocks	9/49
Cf 1	Perch Creek	10	do	Pleistocene deposits	9/49
Ee 1	Cecilton	20	do	Pleistocene deposits	8/49[a]
Ee 2	Cecilton	22	do	Pleistocene deposits	10/51
			Kent County		
Ken-Dc 1	Pomona	87	artesian	Aquia greensand	11/51
			Queen Annes County		
QA-Be 1	Kingstown	21	water-table	Pleistocene deposits	9/49
Eb 12	Stevensville	194	artesian	Aquia greensand	2/53
Ec 1	Queenstown	21	water-table	Pleistocene deposits	9/49

[a] Abandoned as an observation well in June 1952.

The rises in level represent periods in which recharge exceeds discharge, and the decline periods in which discharge exceeds recharge.

A gross relationship between precipitation and changes in water level is shown by the levels in well Ce-Bf 1, which penetrates the crystalline rocks. The plot of the water levels in well Ce-Cf 1 (10 feet deep) shows a smoother curve than that of Ce-Bf 1, and shows a less obvious correlation with the monthly precipitation. The graph of well QA-Ec 1 is markedly cyclic, but, although a water-table well, shows little relationship to the monthly precipitation. This graph shows that ground-water discharge results in a declining water level from April to late summer, and that recharge begins to raise the water level in October. This relation reflects increased evaporation and transpiration effects during the growing season when discharge from the aquifer exceeds recharge to it, and reduction in these effects during the remainder of the year.

Observation well Ken-Dc 1 is in the outcrop area of the Aquia greensand to a depth of 87 feet. It is used occasionally from May 1 to September 15 only

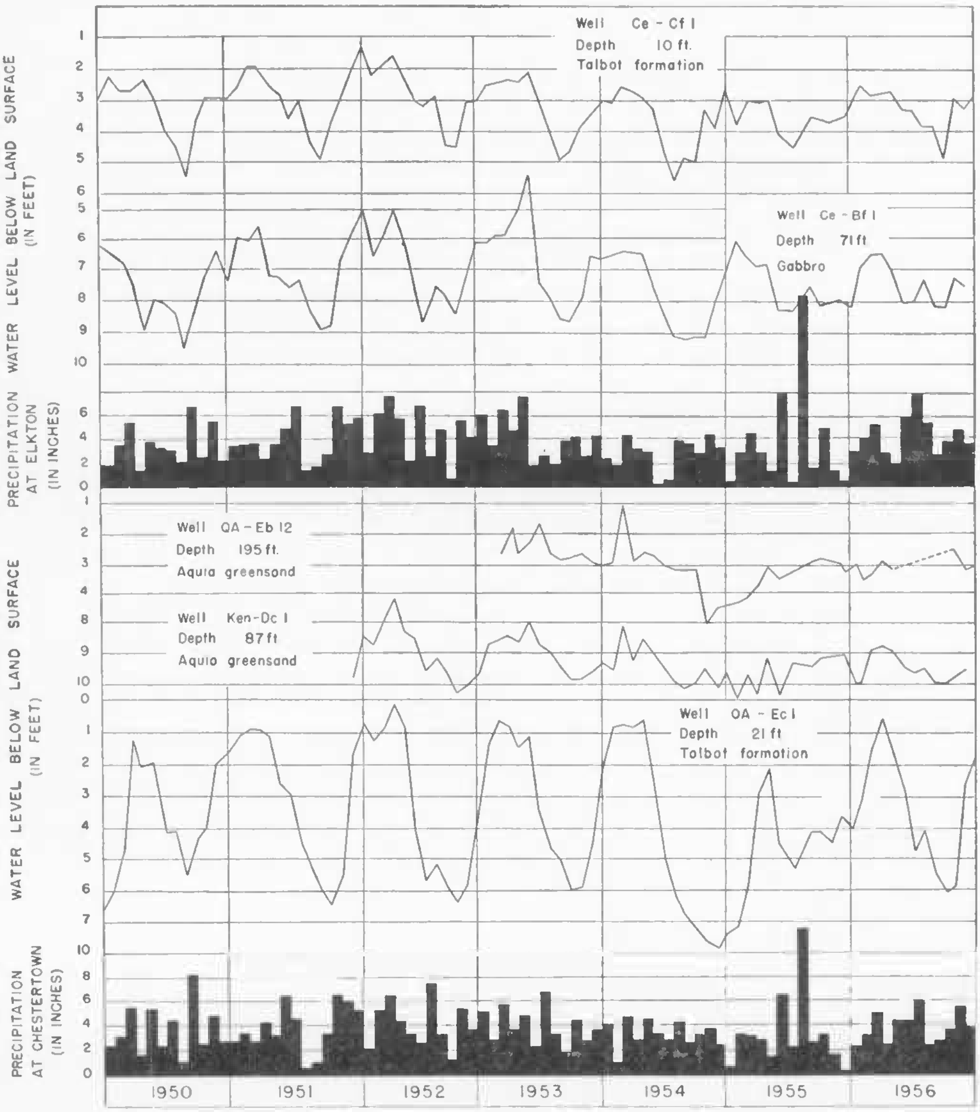

FIGURE 14. Hydrograph of Five Observation Wells and Precipitation at Elkton and Chestertown

for domestic purposes. No other well is within a half mile, so the water level in it is not affected by nearby pumping. The water level record is roughly cyclic from 1952 to the end of 1954, but it does not show the same periodicity during 1955. In this, it follows, in a subdued manner, the trend of the level in the water-table wells. This relationship suggests the existence of semi-artesian hydrologic conditions in the aquifer in the vicinity of this well. The curve of well QA-Eb 12 is more irregular and correlation of it with other hydrologic data is difficult.

Confusion exists in many minds between declining water levels and the depletion of ground-water reservoirs. A declining water level may or may not mean depletion. Heavy pumping may cause a fall in water level over a large area, but when the pumping stops and the water level in the vicinity of the pumped well recovers, there has been no permanent depletion. Water is a replenishable resource, and while it is being removed from a reservoir, it may also be entering the reservoir. When water is withdrawn at a faster rate than it enters a ground-water reservoir, the "safe yield" of the reservoir may be exceeded, at least temporarily.

To determine whether a decline in water level has taken place during the past 40 years, comparisons were made between water levels measured or reported in wells by Clark (Clark and others, 1918) prior to 1918 and the same or neighboring wells in 1952–53. The results are:

(1) Rising Sun—Wells to supply water for the community were drilled in 1913 and have continued as public-supply wells. Water levels in them were reported to be 6 feet below land surface (Clark and others, p. 206). Two of these wells measured in 1952 had the following static water levels:

Well Ce-Ac 39....................7.46 feet below land surface
Well Ce-Ac 40....................6.97 feet below land surface

The 1952 measurements show no significant change at the end of 40 years of pumping.

(2) Massey—Clark reports the water level in dug wells at this town to have been 10 feet below the land surface (p. 276). No recent water level measurements in Massey are available. However, well Ken-Bg 25, near Massey and at the same surface elevation as those at Massey, had a static water level of 12 feet in March 1952. This indicates that the change of levels in this area is not significant.

(3) Millington—At Millington some of the wells mentioned by Clark (p. 276) were visited but their water levels could not be measured. Their levels were reported to be 4 feet below the surface in about 1918. Existing wells in Millington at about the same depth had the following water levels:

Well No.	Depth to water (ft.)	Year measured
Ken-Bf 1	8	1949
Ken-Bf 17	4	1951
Ken-Eb 2	3	1952

The water levels in these wells show no significant departure from levels of the earlier date, although much more ground water is now being used at Millington.

(4) Stevensville—An old well was reported to have a water level 5 feet below the land surface (p. 283). Observation well QA-Eb 12 has a water level about 2 to 3 feet below the land surface. Two other wells in the area have measured water levels 8 feet below the surface. There is no significant difference here between the old and the present levels.

Daily and hourly fluctuations of water levels also take place. In water-table wells a rapid, substantial rise in level may result from a heavy rainstorm. In artesian wells near tidal waters an incoming tide has a similar effect. Barometric pressure changes and even pressure on the earth caused by passing trains may affect the water levels in artesian wells.

TABLE 40

Average Daily Ground-water Uses by Types in Cecil, Kent, and Queen Annes Counties

(in gallons)

Type of use	Cecil County	Kent County	Queen Annes County
Public supply	300,000	314,000	166,000
Commercial and industrial	50,000	25,000	30,000
Domestic	1,150,000	475,000	618,000
Farm	620,000	273,000	369,000
Total	2,120,000	1,087,000	1,183,000

CONSUMPTION AND USE OF GROUND WATER

The daily consumption of ground water in the tricounty area is difficult to estimate. Few records of consumption are available. Even public-service operators rarely meter their water. The estimate had to be based chiefly on census figures of population, livestock, and industries. A relatively large seasonal increase in water consumption takes place during the summer months when the canneries and packing houses are in operation. A single cannery may use over a half million gallons of water a day. The figures in Table 40, therefore, indicate only the order of magnitude of the ground-water use in the three counties, which is estimated to be about 4.4 million gallons per day.

It was found that few residents have even the vaguest idea of the amount of water they used daily. Table 41 shows unit consumption of water on the farm.

According to Table 41, a family of five, having hot and cold water, consumes about 250 gallons of water a day; if they have, in addition, a herd of 100 dairy cows, the consumption reaches 3,750 gallons—other uses and losses through leaky pipes bring the figure to about 4,700 gallons a day. Although many farmers have surface-water supplies available most of the time for their livestock, they must be prepared for periods of drought, and must, therefore, have a supplemental ground-water source such as a well or a spring.

The ground water of the tricounty area is used primarily for farm and domestic purposes, and secondarily, for industrial purposes. Most of the water comes from privately-owned wells, but about a dozen public-service systems, which are either privately- or publicly-owned, are in operation in towns or on real-estate subdivisions.

TABLE 41

Normal Consumption of Ground water for Household and Farm Use

	(gallons per day)
Domestic use (per person)	
Household having	
1 hand pump	10
1 pressure faucet at kitchen sink	15
Hot and cold running water—kitchen, laundry, and bath	50
Livestock	
Per horse, mule, or steer	12
Per dairy cow (drinking only)	15
Per dairy cow (drinking and servicing)	35
Per hog	4
Per 100 chickens	2
Per 100 turkeys	7
Miscellaneous	
Garden hose, ½-inch, 25-foot head	200 per hour
Garden hose, ¾-inch, ¼-inch nozzle	300 per hour

Domestic and Farm Use

On the farm water is used for household purposes and for watering and servicing stock. The use of water, because of the installation of interior plumbing and such items as clothes and dishwashing machines, has expanded rapidly in the last few years. During the summer months the consumption of water for domestic use increases with the influx of thousands of summer residents and visitors. The tricounty area contains many large dairy and stock farms. Dairy cattle require a large amount of water for servicing, but on many farms they get their drinking water for most of the year from surface streams and farm ponds.

Public Supplies

Table 42 lists the public ground-water supplies and their water use in the tricounty area.

Conowingo, Elkton, Bainbridge Naval Training Station, Perryville (in part), and Port Deposit are supplied with water from surface streams.

Industrial Use

There are no heavy industries in the tricounty area. The chief users of ground water for industrial purposes are canneries and packing houses. Canneries use large quantities of water daily during the canning season, which lasts for only about three months. Fish, crab, and oyster packing plants operate for somewhat longer periods. One large sand and gravel quarry uses ground water for washing the material. About 100 commercial establishments were inventoried in the area, chiefly motels, gas stations, and stores—none of which use much water. Industrial plants at Elkton are supplied mainly by surface water.

TABLE 42

Public Ground-water Supplies in Cecil, Kent, and Queen Annes Counties

Location	Source	Formation	Estimated use of water[a] (gpm/day)
Cecil County			
Carpenters Point	Spring Ce-Cc 29	Wicomico	—[b]
	Well Ce-Cc 33	Patapsco	—
Chesapeake City	Well Ce-Cf 2	do	115,400
Holly Hall Terrace	Well Ce-Bf 15	do	6,000
North East	Wells Ce-Bd 18, 19, 23, 63	Crystallines and Patapsco	75,850
Perryville	Springs (in part)	Wicomico	33,950[c]
Rising Sun	Wells Ce-Ac 37, 38	Crystallines	66,800
Kent County			
Chestertown	Well Ken-Cd 2 and two others	Aquia and Talbot	314,300
Galena	Well Ken-Af 8	Matawan and Monmouth	12,950
Rock Hall	Well Ken-Db 1	Matawan	39,300
	Well Ken-Db 35	Raritan(?)	
Queen Annes County			
Centreville	Wells QA-De 27, 28	Monmouth	180,400
Queenstown	Well QA-Ed 36	Aquia	20,500

[a] Based on 1950 population assuming use of 50 gpm/day for towns without sewerage systems and 100 gpm/day where sewerage systems exist.

[b] Resort area, supplies used chiefly during summer.

[c] Includes use of both surface water and ground water.

Irrigation

Considerable interest is being shown in the use of ground water for supplemental irrigation, both water table water from dug-out farm ponds and artesian water from wells.

The use of water from the estuaries for irrigation purposes is being considered, and at least two large farms are using such water. In 1952 a preliminary investigation of the salinity of the tidal estuaries was made (Murphy, 1956). Part of the report having to do with the upper tricounty area states the following:

"The Chester River at Millington appears to be satisfactory for irrigation regardless of tide stage. However, from Crumpton downstream the (chemical character of) water would range from doubtful to unsatisfactory regardless of the tide stage".

WELL TYPES

The type of well constructed depends on the kind of rock from which the water is to be obtained, the depth of the well, and the cost. The choice between a drilled well and a driven or dug well is generally based on cost, although at places it may be determined by the character of the water. In parts of Kent County good water may be obtained from shallow dug or driven wells, whereas that from deeper drilled wells is high in iron.

Drilled wells are of three types, cable tool or percussion, jetted, and rotary. Cable tools are commonly used in areas of hard rocks, and jets and rotaries in areas of soft unconsolidated rock. Most wells in the Piedmont part of Cecil County are cable tool wells and those in the Coastal Plain are jetted or rotary wells. In the cable-tool type the rock is broken by the fall of a heavy steel bit, and the broken rock is bailed out. The cable tool wells of Cecil County are generally 6 inches in diameter. Commonly, the casing is driven to the top of the hard rock and the hole left open below. In the jetted type of well the soft rock is chopped up by the fall of a knife-like bit and is washed out of the hole by circulating water. The jetted wells in Kent County are mostly 4 inches in diameter. Casing is put to the top of the water-bearing stratum, and a screen, or strainer, below it to the bottom of the hole. The screens generally are 5 to 10 feet long. In the northern part of Queen Annes County jetted wells are 4 inches in diameter and may or may not be screened. In southwest Queen Annes County most of the wells are $1\frac{1}{2}$ inches in diameter and are drilled to the first hard bed in the upper part of a water-bearing formation. Commonly, casing is driven into the hard bed and the well drilled ahead. The hole is left open without a screen. The practice varies somewhat, however, with different drillers. In rotary drilling the rock is broken by a rotating bit and removed by circulating mud.

Driven wells are generally less than 50 feet deep and consist of a $1\frac{1}{2}$-inch pipe with a pointed screen at the bottom. The pipe is hammered down to a water-bearing sand. Dug wells are of various sizes, but generally have a diameter of from $2\frac{1}{2}$ to 4 feet. Most of the wells are lined with brick, cement pipe, or cinder blocks.

In Kent County dug wells are chiefly along the central ridge portion of the county. Many drilled wells are clustered in Betterton, Kentmore Park, and in the outlying subdivisions of Chestertown. West of Chestertown water from dug wells is of much better quality than water from drilled wells, consequently water for domestic use comes chiefly from dug wells. Water from the drilled wells is used for livestock. In Queen Annes County dug and driven wells predominate except in the low-lying areas of Kent Island and The Narrows where the quality of the water from the surficial deposits is likely to be poor.

SUMMARY OF QUANTITATIVE HYDROLOGY

Table 43 summarizes the hydrologic properties of the aquifers. The yields of about 950 wells in the area range from less than 1 to 750 gpm. The average yield of wells in the poorest aquifer, the crystalline rock, is only about one-fifth that of the best aquifer, the Wicomico formation. However, the values given in the table are weighted by hundreds of farm and domestic wells whose yields are substantially below the maximum obtainable from many of the aquifers. In general, the average specific capacities and the transmissibility coefficients show the relative water-bearing character of the aquifers, although the high average specific capacity (5.0 gpm per ft.) of the Calvert formation is anomalous. The comparatively high value of transmissibility of the crystalline rocks at Rising Sun (14,000 gal. per day per ft.) is also anomalous, as it is well above the values for similar rock types reported by Dingman and Ferguson for Baltimore and Harford Counties (2,300 to 10,000 gal. per day per ft.).

The total quantity of water available for use in the tricounty area cannot be accurately determined because of various unknown factors. However, on the basis of reasonable assumptions, a rough estimate can be made.

The quantity of ground water in the sedimentary deposits of Cecil, Kent, and Queen Annes Counties is estimated to be 31 trillion (31×10^{12}) gallons, based on the volume of a sedimentary prism of 13,950 billion cubic feet (surface area of 27.9 billion square feet multiplied by an assumed average thickness of 500 feet) and an estimated average porosity of 30 percent. Much of this water could never be recovered because many of the formations are predominently silt, clay, or sandy clay with low specific yield. If the specific yield averages 5 percent, the quantity recoverable would be only one-sixth of the total given above, or about 5 trillion (5×10^{12}) gallons. This may be compared with the total water in storage in the three reservoirs of Baltimore City, 70 billion (7×10^{10}) gallons. However, to obtain this water would require an enormous number of wells capable of dewatering the water-bearing formations to depths of 500 feet.

TABLE 43

Summary of the Hydrologic Properties of the Aquifers

Aquifer	Yield of wells (gpm)			Specific capacities (gpm/ft)			Hydrologic coefficients		
	No. of wells	Range	Average	No. of wells	Range	Average	Coefficient of transmissibility (gal/day/ft)	Coefficient of storage (dimensionless)	Locality
Talbot formation	6	12–40	24	6	0.6–10.0	3.8	800–1,700	—	Elkton
Wicomico formation (plains deposits)	15	3–200	51	11	.3–20.0	4.3	100,000 30,000	— 0.0003	Barclay Price
Calvert formation	8	15–100	43	5	.9–10.0	5.0	—	—	—
Aquia greensand	352	6–300	27	349	.1–14.3	2.9	6,000 32,000–40,000 24,000	.0004 .0002–0.0003 —	Massey Queenstown Chestertown
Monmouth formation	25	7.5–200[a]	40[a]	25	.2–8.0	1.8[a]	5,000 2,200–4,900 5,500	.0003 .0000003–.0012 .0002	Rock Hall Kennedyville Massey
Matawan formation	12	7.5–180	37.5	12	.2–9.5	1.5	—	—	—
Magothy formation	48	7–85	30	42	.3–6.3	1.4	25,000	.0001	Cecilton
Raritan formation	71	7–300	35	69	.3–7.1	1.3	—	—	—
Patapsco formation	43	3–120	40	39	.1–12.5	1.9	5,000 16,000 24,000	.0001 .005 —	Elkton do (SE) Camp Rodney
Patuxent formation	17	2.5–90	16	15	.1–8.8	1.0	—	—	—
Crystalline rocks	355	1–68	11	155	.1–25.0	1.2	14,000	.003	Rising Sun

[a] Two exceptional wells at Centreville yielding 500 and 750 gpm are omitted as they may be producing from more than one aquifer.

Only about 4.4 million gallons are being used daily in the tricounty area, or only a tiny fraction of the total amount of theoretically recoverable ground water in storage in the sedimentary deposits.

The quantity of ground water recharged by infiltration of rainfall and by infiltration from surface-water bodies is of greater importance, as far as the sustained availability of large quantities of ground water is concerned, than is the quantity of water stored in the sediments. The average precipitation in this area is about 43 inches per year, or an average of 2.1 million gallons per square mile per day. This is equivalent to 2.1 billion (2.1×10^9) gallons per day for the entire tricounty area (2.1 million gallons $\times$ 1,000 sq. miles). However, only about 25 to 30 percent of this amount, or about 400 to 600 million gallons per day is estimated to recharge the ground-water reservoirs of the three counties.

Although this quantity of water is potentially available for use, it is not available immediately and without the cost of pumping. Ground water moves comparatively slowly through the water-bearing formations. It is possible, therefore, by heavy pumping to lower the water level in the immediate vicinity of the pumping wells to the intakes of some of the pumps. The water removed by pumping can be replaced only by slow movement toward the pumping wells from distant points in the ground-water reservoir. It is important, therefore, that detailed hydrologic data for specific areas be obtained before heavy ground-water development is undertaken in an area. These data will be of value in determining well spacing, maximum yield of wells, and other hydrologic factors involved in proper development of an aquifer.

Need for Further Studies

Throughout most of Kent and Queen Annes Counties no data are available concerning the character and extent of the deeper coastal plain aquifers, especially the sands in the Patuxent and Patapsco formations. The Patuxent formation may yield mineralized water to wells where the aquifer lies below a depth of 1,000 feet. Additional aquifer tests should be made of sands in the Patuxent and Raritan formation in southern Cecil and northern Kent Counties. Because of their importance as a source of water, aquifer tests should also be made on the deposits of Pleistocene and Pliocene(?) age at localities where they have not been tested.

Because of the tidal character of many of the streams, data should be obtained to aid in defining areas where salt-water intrusion could occur as a result of heavy ground-water withdrawals.

Observation well measurements should be continued to better define normal seasonal and annual changes in the ground water stored in the aquifers and to safeguard against local overdrafts on those now used.

TABLE 44

Chemical Analyses of Ground Water in Cecil, Kent, and Queen Annes Counties
(in parts per million, except pH and specific conductance)

Well No.	Water-bearing formation	Date of collection	Silica (SiO_2)	Aluminum (Al)	Iron (Fe), total	Manganese (Mn)	Copper (Cu)	Zinc (Zn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Solids[a]	Hardness as $CaCO_3$	Non-carbonate hardness	Specific conductance ($K \times 10^6$ at 25°C)	pH	Carbon dioxide (CO_2)	Analyst
Ce-Aa 9	Gabbro	12/6/54	22	0.1	0.19	0.01	0.01	0.53	13	9.2	2.2	0.4	0.0	60	4.0	7.8	0.1	16	0.0	13	72	22	157	6.6	24	A
Ab 26	Serpentine	11/10/52	27	.3	.11	.02	.03	1.3	5.6	41	23	10	.1	134	40	26	.1	81	.0	321	186	77	498	7.1	17	A
Ac 53	Granodiorite	12/6/54	22	.0	.11	.02	.02	.91	7.1	1.6	3.3	.5	.1	26	.1	1.2	.0	13	.1	67	26	5	67.6	6.9	5.2	A
Ac 66	Gabbro	6/17/50	17	<.5	.10	.0	—	—	6.4	.2	—	—	—	—	12	8.6	—	1.4	—	94	27	—	—	5.8	—	B
Ac 67	Granodiorite	1/17/50	17	1.5	.4	.0	—	—	6.5	.6	—	—	—	—	.5	10	—	.2	—	88	36	—	—	5.9	—	B
Ad 39	Schist	12/6/54	25	.0	.34	.01	.00	.00	8.0	4.7	3.0	.6	.0	52	.1	2.0	.1	2.0	.0	74	39	0	92.0	7.5	2.6	A
Bd 19	Granodiorite	6/2/48	31	.8	.40	—	—	—	14	2.8	—	—	—	—	15	13	—	—	—	94	68	—	—	7.5	—	B
Bd 23	Patapsco	11/7/52	6.2	.5	.1	.0	—	—	.3	.0	—	—	—	—	1.0	5.6	.0	—	—	22	12	—	—	5.0	—	B
Bd 24	Granodiorite	1/15/53	13	.6	3.5	—	—	—	14	7.9	—	—	—	—	13	23	.0	.7	—	62	84	—	—	5.9	—	B
Bd 63	Do	8/24/54	27	.5	1.2	.0	—	—	11	3.7	—	—	—	—	27	23	.0	.0	—	202	70	—	—	7.3	—	B
Be 18	Patapsco	9/28/54	6.2	.0	.05	.01	.01	.14	1.3	.4	3.2	.4	.0	6.0	1.8	4.2	.1	1.2	.0	23	5	0	27.4	6.2	6.0	A
Bf 12	Wicomico	9/28/54	9.0	.0	.07	.01	.45	.45	3.3	1.7	2.9	.9	.1	15	2.4	3.5	.1	7.2	.0	42	17	4	51.4	6.4	9.5	A
Bf 15	Patapsco	12/2/52	6.1	.0	.40	—	—	—	.9	1.6	—	—	—	—	3.8	4.8	.0	—	—	88	26	—	—	6.1	—	B
Cc 29	Wicomico	3/1/51	5.0	—	.10	—	—	—	3.4	.2	—	—	—	—	5.0	7.0	—	—	—	46	28	—	—	5.5	—	B
Cc 33	Patapsco	10/19/54	6	.0	.5	.0	—	—	.5	.1	—	—	—	—	1.5	6.2	.0	.7	—	36	22	—	—	5.4	—	B
Cc 33	Do	4/15/55	9.0	.1	.80	.02	.03	.39	1.4	.6	2.5	.4	.0	6.6	.3	3.3	.0	2.4	.0	28	7	2	27.8	5.5	32	A
Cc 34	Patuxent	4/15/55	7.1	3.5	.13	.03	.01	2.3	3.5	.8	4.1	.9	.1	34	2.0	7.1	.0	5.6	.0	55	35	7	87.5	6.5	17	A
Cf 2	Patapsco	12/15/48	11	1.9	15	—	—	—	.5	6.5	—	—	—	—	30	4.9	—	—	—	110	65	—	—	6.1	—	B
Cf 2	Do	1/20/50	5	6	25	—	—	—	6.4	.1	—	—	—	—	22	6.3	—	—	—	102	73	—	—	6.1	—	B
Cf 2	Do	2/16/53	—	—	21	—	—	—	8.6	2.3	4.3		—	15	22	3.4	—	.5	—	—	31	19	93.7	5.8	—	A
Cf 18	Raritan	1953	—	—	18	—	—	—	22	3.9	8.0		—	71	27	1.8	—	.5	—	—	71	13	183	6.4	—	A
Dd 51	Magothy	9/28/54	—	—	4.4	—	—	—	—	—	16		—	109	8.5	5.2	—	.1	—	—	70	0	193	6.8	—	A
De 7	Raritan	9/28/54	3.2	.0	13	.38	.00	.20	14	2.3	12	4.4	1.1	94	2.8	1.2	.2	1.0	.0	90	45	0	158	7.5	4.7	A
Df 11	Matawan	1/10/55	21	.0	.46	.07	.00	.30	33	1.5	2.5	3.5	.2	122	7.5	2.0	.4	.1	.1	144	102	2	228	7.7	3.9	A
Ee 5	Aquia	9/28/54	10	.0	.10	.01	.10	5.8	4.6	.1	6.3	1.7	.1	22	.4	8.1	.1	12	.0	58	21	3	77.6	6.8	5.5	A
Ee 11	Magothy	10/6/53	22	1.0	1.0	.0	—	—	25	4.9	—	—	—	—	12	9.2	.4	.0	—	238	106	—	—	7.5	—	B
Ken-Ad 5	Magothy(?)	9/28/54	6.9	.0	24	.18	.00	.82	1.1	.1	2.6	1.5	.0	4.6	5.6	2.6	.1	.5	.0	23	4	1	32.2	6.4	2.9	A
Ad 10	Magothy	9/28/54	14	.0	.11	.23	.23	.92	6.0	2.9	9.5	2.2	.1	10	.3	12	.0	33	.0	92	29	20	122	6.1	13	A
Ad 20	Wicomico	12/21/54	14	.0	.01	.09	.00	.22	13	6.4	16	4.6	.3	21	6.2	28	.0	44	.0	151	59	42	244	6.4	13	A
Ae 18	Matawan	9/28/54	16	.0	1.1	.01	.00	.82	33	.9	3.1	1.7	.1	96	9.2	5.6	.5	.5	.0	122	87	9	187	7.5	4.8	A
Af 8	Matawan and Monmouth	4/16/53	17	<0.5	0.5	—	—	—	36	0.2	—	—	—	—	12	11	0.1	—	—	158	97	—	—	7.4	—	B

Af 17	Monmouth (?)	9/28/54	—	—	.65	—	—	—	—	—	15		—	78	30	39	—	2.9	—	—	120	56	290	6.9	—	A
Af 20	Raritan	9/28/54	—	—	.64	—	—	—	—	—	71		—	172	3.4	14	—	.5	—	—	11	0	296	7.8	—	A
Af 21	Monmouth	10/5/54	18	.0	.8	0.0	—	—	40	2.0	—	—	—	—	24	7.2	.2	.0	—	204	172	—	—	7.3	—	B
Bc 29	Magothy	9/29/54	—	—	2.6	—	—	—	—	—	3.9		—	34	.8	2.6	—	.1	—	—	24	0	72.7	6.1	—	A
Be 5	Matawan and Monmouth	12/21/54	19	.0	2.3	.05	.01	.44	61	1.3	2.5	2.2	.2	190	5.3	2.0	.0	.1	.7	195	158	3	316	7.4	12	A
Bf 1	Aquia	1/10/55	18	.0	.87	.08	.00	.28	41	7.0	2.9	1.3	.1	163	3.5	.8	.1	.1	.0	160	132	0	265	7.5	8.2	A
Bf 9	Monmouth and Aquia	9/28/54	18	.1	3.6	.27	.67	.04	55	1.2	3.0	2.4	.4	169	13	1.8	.1	.5	.0	184	144	6	283	7.6	6.7	A
Bg 15	Wicomico	1/10/55	8.2	.0	.03	.04	.00	.28	38	14	25	20	1.1	163	43	18	.1	46	.0	303	153	19	504	7.8	4.1	A
Cb 31	Talbot	4/—/55	21	—	38	—	—	—	7.0	3.0	17		—	—	.0	46	—	.2	—	182	30	0	—	5.6	141	C
Cb 32	Do	4/2/55	24	—	23	—	—	—	4.2	4.0	20		—	—	4.1	20	—	.3	—	144	27	4.3	—	6.3	29	C
Cd 2	Aquia and Talbot	9/24/47	9.8	.7	.3	—	—	—	9.9	1.4	—	—	—	—	.0	6.7	—	—	—	142	32	—	—	6.4	—	B
Cd 15	Aquia	12/21/54	28	.0	5.6	.06	.01	.24	34	1.0	2.6	2.6	.1	102	7.5	2.8	.0	.1	.0	131	89	6	197	7.8	2.6	A
Cd 33	Aquia and Talbot (?)	12/3/53	7.0	<.5	.0	—	—	—	5.7	1.1	—	—	—	—	.8	11	—	—	—	60	30	—	—	6.0	—	B
Cd 37	Do	10/29/40	12	1.2	.0	—	—	—	9.8	2.3	—	—	—	—	2.4	6.6	—	.0	—	90	46	—	—	6.0	35	B
Cd 38	Do	3/22/48	—	—	.1	—	—	—	—	—	—	—	—	—	—	26	—	—	—	148	55	—	—	5.9	—	B
Db 1	Matawan	11/23/48	27	1.7	24	—	—	—	4.1	1.3	—	—	—	—	1.6	11	—	—	—	96	67	—	—	6.2	—	B
Db 35	Raritan	9/24/53	13	3.8	6.0	—	—	—	3.8	1.1	—	—	—	—	7.6	12	.4	—	—	134	30	—	—	6.3	—	B
QA-Be 4	Aquia	12/21/54	20	.6	0.6	.02	.00	1.4	11	.4	2.9	1.1	.0	38	.1	2.5	.1	8.4	.0	77	35	4	92.0	6.7	12	A
Bg 43	Monmouth	1/10/55	44	.0	3.6	.14	.02	.31	16	4.5	3.4	3.2	.2	71	11	.7	.3	.4	1.0	130	61	3	142	7.5	3.6	A
Cf 2	Aquia	9/29/54	—	—	1.7	—	—	—	—	—	8.7		—	199	6.8	2.6	—	.2	—	—	155	0	319	7.4	—	A
Cf 5	Calvert and Wicomico	9/29/54	18	.0	.04	.06	.05	.01	5.7	2.8	7.5	1.4	.1	20	.6	8.9	.1	18	.0	76	26	10	87	6.9	4.0	A
Db 10	Aquia	12/20/54	38	.1	4.1	.02	.02	.73	136	15	45	3.2	.5	196	216	80	.4	14	.0	698	403	242	975	7.1	25	A
Dd 10	Matawan and Monmouth	12/21/54	19	.0	.21	.01	.06	.00	39	9.1	20	8.4	.2	223	2.7	3.3	.4	.5	.0	216	135	0	359	7.8	5.6	A
De 3	Aquia	12/21/54	21	.0	.81	.01	.01	.19	38	8.3	3.6	9.0	.1	170	6.0	1.5	.2	1.6	.0	182	130	0	279	7.8	4.3	A
De 12	Wicomico	1/10/55	11	.1	1.2	.11	.00	1.6	46	33	16	49	2.4	60	42	48	.2	260	.0	588	254	204	805	6.7	19	A
De 27	Monmouth	9/29/54	—	—	.46	—	—	—	—	—	26		—	190	2.6	2.8	—	1.4	—	—	106	0	307	7.3	—	A
De 28	Do	9/29/54	—	—	.19	—	—	—	—	—	23		—	189	.8	4.2	—	.1	—	—	112	0	316	7.6	—	A
Df 23	Wicomico	1/10/55	9.5	.0	.04	.06	.00	.30	5.5	4.0	10	6.8	.3	9.6	6.2	11	.0	42	.0	107	31	23	150	6.0	15	A
Ea 4	Aquia	10/8/47	40	2.1	.8	.0	—	—	38	6.7	—	—	—	—	16	9.6	—	—	—	224	132	—	—	7.4	—	B
Ea 10	Aquia	12/20/54	27	.0	.57	.01	.00	.31	43	7.5	4.1	4.6	.1	186	.1	3.1	.2	1.5	.0	187	139	0	297	7.5	9.3	A
Eg 83	Do	9/29/54	15	.0	.06	.01	.00	1.0	31	12	41	12	2.6	290	1.4	4.0	.3	1.3	.1	260	128	0	435	7.8	7.3	A
Ed 36	Do	12/20/54	16	.1	.39	.00	.02	.00	34	11	11	12	.2	199	5.0	1.3	.5	.2	.0	194	131	0	322	7.8	5.0	A
Fa 39	Do	12/20/54	18	.0	.46	.02	.00	.24	23	4.7	85	6.2	.2	289	7.0	18	1.1	.2	.1	312	77	0	507	7.8	7.3	A
Tal-Af 5	Calvert (?)	12/21/54	51	.0	.17	.00	.00	.00	22	11	30	9.8	.1	207	2.0	2.1	.4	1.0	.0	256	100	0	363	8.1	2.6	A

Analyst: A, U. S. Geological Survey; B, Maryland State Health Department; C, Penniman & Browne, Inc.

[a] Solids in "A" analyses are dissolved solids; in "B" analyses, they are dissolved solids plus suspended solids.

TAB

Records of Wells and S

Water levels: Measured water levels are designated by "m".
Pumping equipment: Method of lift: B, bucket; C, cylinder; J, jet; N, none; NI, pump to be installed; S, suction; T, tur
Type of power: E, electricity; G, gasoline; H, hand; W, wind.
Use of water: C, commercial; D, domestic; F, farm; N, not used; P, public supply; S, school.
Remarks: Chemical analyses referred to are in Table 44.
Well logs referred to are in Tables 48 and 51.

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Aa 1	D. McCullough	L. H. Brown	1951	380	Drilled	50	6	46	0
Aa 2	G. V. Bannister	do	1950	380	do	60	6	8	0
Aa 3	Leo Eckman	do	1950	390	do	79	6	78	0
Aa 4	Thompson & McMillion	H. A. Thomas	1951	340	do	85	6	80	0
Aa 5	B. E. McKonly	L. H. Brown	1951	460	do	41	6	35	0
Aa 6	H. D. Graybeal	do	1946	330	do	31	6	—	0
Aa 7	Joseph Peters	—	—	250	Spring	—	—	—	—
Aa 8	Edwin S. Pierce	L. H. Brown	1952	280	Drilled	50	6	4	0
Aa 9	H. A. Watts	do	1952	325	do	39	6	30.5	0
Aa 10	Curtis Ragan	—	1952	315	do	45	6	—	0
Aa 11	Conowingo Power Co.	—	—	260	Spring	—	—	—	—
Aa 12	C. H. Brown	L. H. Brown	—	370	Drilled	80	6	—	0
Aa 13	Do	—	Old	370	Dug	17	—	—	0
Aa 14	Conowingo Power Co.	—	—	160	Spring	—	—	—	—
Aa 15	Earl Hagen	—	Old	340	Dug	41	60	—	0
Aa 16	J. C. Palmer	—	—	390	do	31	40	—	0
Aa 17	B. E. Caldwell	L. H. Brown	1952	325	Drilled	50	6	22	0
Aa 18	Do	do	1953	315	do	58	6	20	0
Ab 1	Arthur Wayne	G. Rinier	1950	350	do	83	6	11	0
Ab 2	Henry L. Coulter	do	1952	330	do	52	6	35	0
Ab 3	Ernest Wayne	do	1952	345	do	46	6	40	0
Ab 4	H. Sochner	do	1952	340	do	75	6	48	0
Ab 5	W. Davidson	do	1951	340	do	19	6	8	0
Ab 6	Thomas Hamilton	B. F. Miller	1952	360	do	60	6	—	0
Ab 7	E. S. Adams	L. H. Brown	1951	360	do	50	6	40	0
Ab 8	W. Luelles	do	1951	360	do	51	6	31	0
Ab 9	Roscoe Rakes	S. D. Smith	1950	360	do	55	6	35	0
Ab 10	Harry Burd	H. Morgan	1949	360	do	52	6	51	0
Ab 11	C. C. Cole	L. H. Brown	1952	160	do	25	6	20	0
Ab 12	Wm. Fretwell	B. F. Miller	1952	340	do	42	6	17	0
Ab 13	Wm. McGlocklin	do	1952	320	do	60	6	40	0
Ab 14	Donald Balderston	R. W. Slauch & Sons	1952	360	do	53	6	26	0
Ab 15	W. D. Adams	B. F. Miller	1952	360	do	58	6	4	0
Ab 16	John Rak	L. H. Brown	1952	350	do	46	6	40(?)	0
Ab 17	George N. Parker	do	1952	340	do	30	6	15	0
Ab 18	Thomas Johnson	do	1952	340	do	30	6	22	0

LE 45

prings in Cecil County

bine.

Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Gabbro	20	30	7/27/51	C,H	8	7/27/51	0.8	D	—	Water reported fair; hard, irony. See driller's log.
Serpentine	20	30	5/30/50	C,H	12	5/30/50	1.2	D	—	See driller's log.
do	20	40	8/14/50	J,E	6	8/14/50	.3	D,F	—	Do
do	20	60	10/29/51	S,H	10	10/29/51	.3	D	—	Water at 30, 65, 84 feet. See driller's log. Water reported good. Supplies two families.
do	8	14	8/24/51	J,E	10	8/24/51	1.7	C	—	Water reported good. Restaurant. See driller's log.
Gabbro	—	—	—	S,E	—	—	—	C	—	Water reported good. Store.
do	—	—	—	—	2	12/18/52	—	D	—	
do	19	28	9/16/52	C,H	4	9/16/52	.4	D	—	See driller's log.
do	20	28	10/2/52	J,E	8	10/2/52	1.0	D	51	See chemical analysis and driller's log.
do	—	—	—	C,H	—	—	—	D,F	—	Water reported good.
do	—	—	—	N	2	12/18/52	—	D	—	Water good; steady flow.
Serpentine	—	—	—	S,E	—	—	—	D	—	Water reported good.
do	6.75 [m]	—	12/18/52	—	—	—	—	N	—	Water unfit for drinking.
Schist-serpentine contact	—	—	—	N	7	12/18/52	—	D	—	Water reported good; steady flow.
Schist	26.85 [m]	—	12/18/52	C,H	—	—	—	D	—	
Serpentine	9.17 [m]	—	12/18/52	B,H	—	—	—	D	—	
do	4	35	12/16/52	C,H	8	12/16/52	.3	D	—	See driller's log.
do	12	36	2/19/53	C,H	6	2/19/53	.3	D	—	Water reported slightly irony.
Granodiorite	25	—	12/22/50	J,E	8	12/22/50	—	D	—	See driller's log.
Gabbro	26	—	6/16/52	J,E	6	6/16/52	—	D	—	
do	28	—	6/11/52	J,E	8	6/11/52	—	D	—	
Granodiorite	25	—	3/19/52	J,E	6	3/19/52	—	D	—	
do	6	—	5/3/51	J,E	8	5/3/51	—	D	—	Supplies 2 houses.
do	15	—	4/7/52	J,E	3	4/7/52	—	D	—	
do	22	40	12/21/51	J,E	4	12/21/51	.2	D	—	Static level 14.10 ft. below land surface, 8/18/53. Supplies 2 houses.
do	10	20	10/26/51	J,E	10	10/26/51	1.0	D	—	
do	20	25	6/10/50	J,E	11	6/10/50	2.2	D	—	
do	10	20	11/14/49	J,E	15	11/14/49	1.5	D	—	Store. See driller's log.
do	10	15	9/3/52	S,H	4	9/3/52	.8	D	—	
do	15	—	4/26/52	J,E	20	4/26/52	—	D	—	
do	30	40	5/1/52	J,E	4	5/1/52	.4	D	—	
do	25	35	4/3/52	—	7	4/3/52	.7	D	—	See driller's log
Gabbro(?)	45	52	9/30/52	J,E	7.5	9/30/52	1.1	D	—	
Granodiorite	8	20	8/12/52	S,H	8	8/12/52	.7	D	—	
do	8	15	9/4/52	S,H	10	9/4/52	1.4	D	—	Do
do	8	15	9/8/52	S,H	15	9/8/52	2.1	D	—	

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ab 19	Ray Johnson	L. H. Brown	1952	330	Drilled	35	6	—	0
Ab 20	Walter S. Childs	F. H. Dougherty	1952	300	do	47	6	11	0
Ab 21	Burton Boyd	—	1935	345	do	41	6	—	0
Ab 22	George McMullen	—	Old	440	Dug	28	36	—	0
Ab 23	W. H. Cook	—	—	340	Spring	—	—	—	—
Ab 24	Cephas Dalton	—	—	215	Dug	35	48	—	0
Ab 25	Horace Reynolds	—	Old	380	do	29	42	—	0
Ab 26	Raymond Scheib	L. H. Brown	1952	450	Drilled	80	6	15	0
Ab 27	Roy Cole	do	1952	410	do	60	6	31	0
Ab 28	Rev. Leslie Alder	F. H. Dougherty	1952	370	do	60	6	35.5	0
Ab 29	Wm. Sullivan	B. F. Miller	1953	290	do	34	6	—	0
Ab 30	Frances Elville	L. H. Brown	1952	120	do	25	6	24	0
Ab 31	Donald J. Kirk	B. F. Miller	1952	370	do	41	6	25	0
Ab 32	Thomas Hopkins	F. H. Dougherty	1952	280	do	48	6	31	0
Ab 33	Branham Perry	L. H. Brown	1952	450	do	40	6	40	0
Ab 34	Silver Canning Co.	—	—	260	do	60	6	—	0
Ab 35	Howard Tome	B. F. Miller	1949	290	do	77	$5\frac{5}{8}$	—	0
Ab 36	R. Coulter	G. Rinier	1949	330	do	44	6	—	0
Ab 37	W. D. Adams	B. F. Miller	1953	360	do	50	$5\frac{5}{8}$	50	0
Ab 38	Garney Brooks	L. H. Brown	1953	440	do	35	$5\frac{5}{8}$	15	0
Ab 39	Clayton Brown	do	1953	370	do	50	$5\frac{5}{8}$	49	0
Ab 40	J. A. Ragan	G. Rinier	1948	270	do	44	6	31	0
Ab 41	Rev. A. A. Holbrook	H. Morgan	1949	365	do	64	6	—	0
Ab 42	Charles F. Cooley	do	1949	410	do	59	6	18	0
Ab 43	Horace Cullen	F. H. Dougherty	1953	40	do	50	6	11	0
Ab 44	Robert W. Kane	H. Morgan	1949	40	do	50±	6	29	0
Ac 1	R. L. Wright	R. W. Slauch & Sons	1950	480	do	56	$5\frac{5}{8}$	51	0
Ac 2	R. Snyder	L. H. Brown	1949	410	do	108	6	105	0
Ac 3	W. H. Crigler	G. Rinier	1950	380	do	92	6	75	0
Ac 4	J. Gambell, Jr.	do	1951	395	do	112	6	90	0
Ac 5	R. Carpenter	F. H. Dougherty	1952	390	do	78	6	69	0
Ac 6	Albert K. Schuman	L. H. Brown	1951	440	do	68	6	6	
Ac 7	S. Teagues	G. Rinier	1951	360	do	80	6	75	0
Ac 8	H. C. Jones	F. H. Dougherty	1952	370	do	75	6	66	0
Ac 9	D. H. Harrington	A. C. Reider & Son	1952	420	do	55	6	31.5	0
Ac 10	L. Donache	E. L. Reider	1951	435	do	109	6	99	0
Ac 11	E. Robinson	L. H. Brown	1952	435	do	105	6	91	0
Ac 12	J. Kyle	do	1952	435	do	90	6	86	0
Ac 13	V. Tome	B. F. Miller	1952	435	do	92	6	85	0
Ac 14	B. Neff	do	1952	435	do	92	6	55	0
Ac 15	J. Montgomery	E. L. Reider	1951	400	do	115	6	97	0

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Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Granodiorite	9	25	8/20/52	S,H	10	8/20/52	0.6	D	—	See Driller's log
Granodiorite-gabbro contact	31	34	11/15/52	—	20	11/15/52	6.7	D	—	Do
Gabbro	3.54[m]	—	12/17/52	S,E	—	—	—	D	—	
Serpentine	—	—	—	S,E	—	—	—	D	—	Unfit for drinking. Dry in summer.
Gabbro	—	—	—	S,E	12	12/17/52	—	D	—	Steady flow; never dry; supplies 2 houses.
do	—	—	—	S,E	—	—	—	D	—	
do	15.60[m]	—	12/17/52	S,E	—	—	—	D,F	—	Water reported hard.
Serpentine	20	53	11/10/52	—	6	11/10/52	1.8	D	50	See chemical analysis and driller's log.
Gabbro	18	40	9/27/52	S,H	10	9/27/52	.5	D	—	
Granodiorite	22	55	10/29/52	J,E	5	10/29/52	.2	D	—	See driller's log.
do	10	—	1/3/53	J,E	15	1/3/53	—	D	—	
Gabbro-granodiorite contact	4	18	7/26/52	S,E	10	7/6/52	.7	D	—	
Granodiorite	15	20	9/15/52	J,E	5	9/15/52	1.0	D	—	
Gabbro(?)	22.5	25	11/1/52	—	20	11/1/52	.8	D	—	Do
Gabbro	18	32	11/1/52	S,H	10	11/1/52	.7	D	—	See driller's log. Static level 7.17 ft. below land surface, 4/14/53.
Granodiorite	12	—	4/16/53	J,E	—	—	—	C	—	Cannery.
do	35	50	1/5/49	J,E	8	1/5/49	.5	D	—	
do	8	—	7/19/49	—	8	7/18/49	—	D	—	See driller's log.
do	20	35	1/7/53	J,E	15	1/7/53	1.0	D	—	
Gabbro-serpentine contact	11	28	5/16/53	J,E	10	5/16/53	.6	D	—	
Gabbro	26	38	4/16/53	J,E	10	4/16/53	.8	C	—	Furniture store.
do	13	—	7/28/49	J,E	8	7/28/49	—	D	—	See driller's log.
—	20	27	9/28/49	J,E	17	9/28/49	2.4	D	—	Church.
Granodiorite	20	30	9/24/49	J,E	14	9/24/49	1.4	D,F	—	See driller's log.
do	14	42	5/2/53	J,E	6	5/2/53	.2	D	—	Do
do	10	25	8/20/49	J,E	20	8/20/49	1.3	D	—	
Gabbro	20	—	11/7/50	S,E	20	11/7/50	—	D	—	Water reported hard and irony. See driller's log.
Granodiorite	18	40	12/20/49	J,E	12	12/20/49	.5	D	—	
Granodiorite-gabbro contact	8	—	7/8/50	J,E	5	7/8/50	—	D	—	Supplies 2 apartments and house.
do	18	—	3/31/51	J,E	5	3/31/51	—	D	—	
do	13	50	8/15/52	J,E	10	8/15/52	.3	D	—	
Serpentine	26	56	5/17/51	J,E	3	5/17/51	.1	D	—	See driller's log.
Pegmatite(?)	8	—	5/21/51	J,E	4	5/21/51	—	D	—	Do
Gabbro	8	70	7/28/52	J,E	3	7/28/52	<.1	D	—	
Granodiorite	20	50	2/18/52	J,E	8	2/18/52	.3	D	54	See driller's log. Static level 30.62 ft. below land surface, 9/52/52.
Schist	12	90	3/2/52	J,E	8	3/2/52	.1	D	—	
do	20	30	2/14/52	J,E	6	2/14/52	.6	D	—	
do	20	32	2/16/52	J,E	10	2/16/52	.8	D	—	
do	20	60	3/12/52	J,E	3	3/12/52	<.1	D	—	
do	25	50	3/17/52	J,E	5	3/17/52	.2	D	—	
do	15	85	3/7/51	J,E	10	3/7/51	.1	C	58	Gas station.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ac 16	A. M. Gamble	G. Rinier	1950	400	Drilled	75	6	60	0
Ac 17	H. E. Balling	W. E. Schum	1952	420	do	75	6	60	0
Ac 18	H. B. Tome	G. Rinier	1950	450	do	80	6	76	0
Ac 19	Frank Delp	L. H. Brown	1950	430	do	90	6	—	0
Ac 20	E. C. Duncan	E. L. Reider	1951	390	do	88	6	86	0
Ac 21	Wilson Ayers	G. Rinier	1950	430	do	115	6	114	0
Ac 22	E. McCulley	do	1950	410	do	54	6	50	0
Ac 23	Do	do	1951	410	do	68	6	65	0
Ac 24	Do	do	1951	410	do	56	6	50	0
Ac 25	A. B. Harrington	S. D. Smith	1952	360	do	72	6	59	0
Ac 26	Cooperative Ground-water Program	Shannahan Artesian Well Co.	1956	330	do	98	4	—	0
Ac 27	Ethel Reedy	F. H. Dougherty	1952	415	do	85	6	82	0
Ac 28	M. F. Brumfield	E. L. Reider	1951	440	do	118	6	117	0
Ac 29	Robert A. Cissel	—	Old	425	Dug	44	42	—	0
Ac 30	Do	—	—	430	do	40	42	—	0
Ac 31	George Montgomery	—	Old	460	do	50	45	—	0
Ac 32	J. W. Graybeal	L. H. Brown	1943	460	Drilled	186	6	—	0
Ac 33	Do	—	Old	450	Dug	45	48	—	0
Ac 34	Stuart Baugher	S. Baugher	1948	445	do	28	42	—	0
Ac 35	Harry Fox	—	Old	380	do	32	42	—	0
Ac 36	Do	—	—	370	Spring	—	—	—	—
Ac 37	Town of Rising Sun	Norris & Scotten	1913	330	Drilled	121	6	—	0
Ac 38	Do	do	1913	328	do	164	6	—	0
Ac 39	Do	do	1913	325	do	111	6	—	0
Ac 40	Do	do	1913	324	do	96	6	37	0
Ac 41	Clarence Comer	—	Old	445	Dug	25	36	—	0
Ac 42	Do	—	—	440	do	24	30	—	0
Ac 43	William Creeger	—	Old	360	do	18	48	—	0
Ac 44	D. D. Hanna	—	1843	335	do	39	48	—	0
Ac 45	G. B. Felty	—	—	385	do	30	40	—	0
Ac 46	Paul McKee	F. H. Dougherty	1952	405	Drilled	50	6	24	0
Ac 47	L. Coulter	B. F. Miller	1952	380	do	90	6	90	0
Ac 48	Floyd Gamble	do	1953	400	do	61	6	57	0
Ac 49	Everett McCauley	do	1953	405	do	60	6	45	0
Ac 50	David D. Wilson	F. H. Dougherty	1953	380	do	56	6	52	0
Ac 51	Clarence Baughman	B. F. Miller	1948	365	do	68	6	—	0
Ac 52	Do	do	1948	365	do	60	6	—	0
Ac 53	Clifford Marker	G. Rinier	1948	460	do	85	6	81	0
Ac 54	William Buck	F. H. Dougherty	1952	460	do	150	6	145	0
Ac 55	P. E. Tome	B. F. Miller	1949	450	do	85	5⅝	—	0
Ac 56	Joseph Biggs	G. Rinier	1949	440	do	90	6	75	0

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Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Schist	12	—	7/5/50	—,E	8	7/5/50	—	D	—	See driller's log.
Granodiorite	12	45	6/20/52	J,E	10	6/20/52	.3	D	—	Do
Schist	15	—	5/19/50	J,E	6	5/19/50	—	D	—	
Granodiorite	20	48	4/8/50	J,E	—	—	—	D	—	Do
Schist	20	45	2/14/51	J,E	8	2/14/51	.3	D	—	See driller's log. Static level 6.99 ft. below land surface, 9/29/52.
do	18	—	5/5/50	—,E	4	5/5/50	—	D	—	See driller's log.
do	12	—	5/24/51	J,E	5	5/24/51	—	D	—	
do	9	—	8/28/51	J,E	4	8/28/51	—	D	—	Do
do	9	—	9/1/51	J,E	5	9/1/51	—	D	—	
Granodiorite	8	13	2/18/52	—	17	2/18/52	3.4	D,F	—	Do
do	—	—	—	—	—	—	—	N	—	Test hole for formation; well plugged. See driller's log.
Schist-granodiorite contact	5	15	8/30/52	S,E	30	8/30/52	3.0	D	—	See driller's log.
Schist	22	80	2/21/51	J,E	6	2/21/51	.1	D	—	
do	30	—	12/—/52	C,E	—	—	—	D,F	—	Water reported hard.
do	35	—	11/—/52	J,E	—	—	—	D	—	Water reported slightly hard.
Granodiorite	40	—	Summer, 1952	J,E	—	—	—	D	—	
do	—	—	—	J,E	—	—	—	D,F	—	
do	—	—	—	S,H	—	—	—	D	—	Water reported hard and irony.
Gabbro	11	—	12/16/52	S,H	—	—	—	D	—	Water reported slightly irony.
do	20	—	12/52	C,H	—	—	—	D	—	Went dry once.
do	—	—	—	S,E	3	12/16/52	—	D,F	—	Gets low in summer.
Granodiorite	—	—	—	T,E	50	7/9/53	—	P	—	
do	—	—	—	T,E	68	7/8/53	—	P	—	
do	5.76 m	—	12/16/52	N	—	—	—	N	—	Observation well: 1953–54. Used as stand-by well. Recased 7/1/53—45 feet of 6-inch casing.
do	4.97 m	—	4/10/53	—	—	—	—	N	49	
do	—	—	—	S,E	—	—	—	D	—	Reported to corrode pipes.
do	8.71 m	—	12/17/52	J,E	—	—	—	F	—	Do
Granodiorite-schist Contact	13.93 m	—	12/17/52	S,E	—	—	—	D,F	—	Dry in fall of 1952.
Gabbro	—	—	—	S,H	—	—	—	D	—	Water reported hard and irony.
Serpentine	3	—	12/—/52	S,H	—	—	—	D	—	Water reported slightly hard.
Gabbro-granodiorite contact	15	20	12/31/52	J,E	25	12/31/52	5.0	D	—	Water reported slightly irony. See driller's log.
Gabbro	15	50	12/28/52	J,E	5	12/28/52	.1	D	—	See driller's log.
Schist-gabbro contact	8	30	12/15/53	J,E	10	12/15/53	.5	D	—	
do	20	30	12/20/52	J,E	5	12/20/52	.5	D	—	
Gabbro	3.5	48	5/23/53	S,E	5	5/23/53	.1	D	—	Water reported slightly hard.
Granodiorite	30	—	10/31/48	S,E	3	10/31/48	—	D	—	See driller's log.
do	30	—	11/15/48	—,E	3	11/15/48	—	D	—	
do	15.66 m	—	8/19/53	J,E	—	—	—	D	58	See chemical analysis.
Schist	18	44	10/15/52	—,E	4	10/15/52	.2	D	—	See driller's log.
do	30	56	6/24/49	J,E	5	6/24/49	.2	D	—	
do	25	—	9/2/49	J,E	5	9/2/49	—	D	—	

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ac 57	J. C. Kerns	F. H. Dougherty	1953	400	Drilled	100	6	98	0
Ac 58	H. Tome	B. F. Miller	1952	435	do	88	6	80	0
Ac 59	Solomon Ingram	H. Morgan	1950	415	do	80	6	67	0
Ac 60	Ernest Cullen	—	Old	370	Dug	35	36	—	0
Ac 61	Cameron Brothers Canning Co.	—	1919	390	Drilled	61	6	—	0
Ac 62	Do	—	1919	390	do	84	6	—	0
Ac 63	Do	—	1919	390	do	80	6	—	0
Ac 64	A. A. Tanner	—	1930	380	do	180	6	—	0
Ac 65	—Montgomery	—	—	485	Dug	25	36	—	0
Ac 66	West Nottingham Academy	—	—	355	do	35±	36±	—	0
Ac 67	Do	—	—	350	do	22	36±	—	0
Ad 1	Reuben Reynolds	R. W. Slauch & Sons	1950	390	Drilled	58	6	51	0
Ad 2	Brady Potter	L. H. Brown	1951	460	do	90(?)	6	82	0
Ad 3	Dr. William Lynch	do	1951	410	do	90	—	—	0
Ad 4	Sarah Alexander	—	1842	420	Dug	43	40	—	0
Ad 5	Harold Shoun	L. H. Brown	1952	450	Drilled	70	6	65	0
Ad 6	Earl Cox	R. W. Slauch & Sons	1952	425	do	81	6	79	0
Ad 7	James V. Yale	—	Old	450	Dug	35	48	—	0
Ad 8	Do	—	1934	450	do	11	36	—	0
Ad 9	Edward E. Yerkes	R. W. Slauch & Sons	1952	380	Drilled	110	6	63	0
Ad 10	Edward Truitt	—	—	370	Dug	23(?)	42(?)	—	0
Ad 11	W. R. Mason	—	1850	450	do	40	—	—	0
Ad 12	James Gifford	—	—	385	Drilled	109	6	—	0
Ad 13	Riley Patrick	—	—	420	Dug	39	40	—	0
Ad 14	Norman J. Fell	Carter	1927	420	Drilled	80	6	—	0
Ad 15	Do	do	1922	420	Dug & Drilled	78	6	—	0
Ad 16	R. M. Pinkerton	—	Old	385	Dug	20	30	—	0
Ad 17	Charles Loggins	—	do	380	do	33	48	—	0
Ad 18	Do	—	—	380	Drilled	160	6	—	0
Ad 19	Taylor Brown	Scott and Yaw	1922	410	do	135	6	—	0
Ad 20	Do	—	1917	410	Dug	35	42	—	0
Ad 21	R. J. Gray	—	Old	370	do	26	48	—	0
Ad 22	Do	—	Old	365	do	30	48	—	0
Ad 23	H. C. Dowell	L. H. Brown	1945	440	Drilled	69	6	—	0
Ad 24	Harry C. Hall, Jr.	—	1800	440	Dug	31	54	—	0
Ad 25	H. S. Ewing	L. H. Brown	1938	380	Drilled	90	6	—	0
Ad 26	George Rhoades	—	Old	365	Dug	19	30	—	0
Ad 27	E. K. Boyd	—	do	425	do	27	29	—	0
Ad 28	Edgar Thompson	Le Roy	1947	380	Drilled	120	6	—	0
Ad 29	H. A. Criswell	—	Old	385	Dug	35	48	—	0
Ad 30	Do	—	1850	385	do	25	48	—	0
Ad 31	Charles England	—	—	350	do	20	36	—	0
Ad 32	Do	L. H. Brown	1945	346	Drilled	42	6	—	0

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Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Schist	15	90	5/20/53	NI	8	5/20/53	0.1	D	—	
do	25	75	12/8/52	J,E	5	12/8/52	.1	D	—	See Driller's log
Granodiorite-schist contact	60	65	3/6/50	J,E	15	3/6/50	3.0	D	—	
Schist	31	—	1948	S,E	—	—	—	D	—	
do	24.39 [m]	—	9/12/53	T,E	—	—	—	C	—	Cannery. Pumps sand.
do	46.23 [m]	—	9/12/53	T,E	—	—	—	C	—	Cannery.
do	27.53 [m]	—	9/12/53	J,E	—	—	—	C	—	Do
Granodiorite	—	—	—	C,E	—	—	—	D,F	—	
Gabbro	9.23 [m]	—	4/16/55	—	—	—	—	D	56	Housewell, 2 other dug wells.
do	—	—	—	—	—	—	—	N	—	See chemical analysis.
Granodiorite	12.34 [m]	—	6/5/56	—,E	—	—	—	S	—	Do
Schist gabbro contact	22	50	11/29/50	J,E	7	11/29/50	.3	D	—	See driller's log.
Schist	25	60	11/2/51	J,E	5	11/2/51	.1	D,F	—	Mushroom farm. See driller's log.
do	9	25	10/12/51	—,E	10	10/12/51	.6	F	50	Water hard and irony. See driller's log.
do	—	—	—	S,H	—	—	—	D	—	
do	25	40	5/12/52	NI	10	5/12/52	.7	D	—	See driller's log.
do	8	—	2/15/52	J,E	15	2/15/52	—	D	—	Do
Serpentine	20—25	—	11/13/52	S,E	—	—	—	D	—	Water hard, acid.
do	—	—	—	J,E	—	—	—	F	—	Well frequently dry.
Granodiorite-Schist contact	20	40	8/4/52	—,E	5	8/4/52	.3	D	—	See driller's log.
Schist	—	—	—	S,E	—	—	—	D	—	
do	—	—	—	J,E	—	—	—	D,F	—	
do	3.84 [m]	—	11/17/52	S,E	—	—	—	D	—	
Serpentine	25.22 [m]	—	11/17/52	J,E	—	—	—	D	—	Dry in summer.
Schist	16	—	11/17/52	S,E	—	—	—	D	—	Water reported slightly hard.
do	20	—	11/17/52	J,E	—	—	—	F	—	Water reported hard.
Granodiorite	6	—	12/9/52	S,E	—	—	—	D,F	—	
Schist-gabbro contact	—	—	—	J,E	—	—	—	D	—	
do	—	—	—	J,E	—	—	—	F	—	
do	35	—	1942	J,E	—	—	—	D,F	—	
do	22	—	12/—/50	NI	—	—	—	N	—	Dry at times.
Granodiorite	—	—	—	J,E	—	—	—	F	—	
do	—	—	—	S,E	—	—	—	D	—	
Schist	12	—	12/12/52	J,E	—	—	—	D,C	—	Supplies garage and house.
do	10.93 [m]	—	12/12/52	J,E	—	—	—	D	—	
do	—	—	—	S,E	—	—	—	D	—	
do	7.88 [m]	—	12/12/52	S,E	—	—	—	D	—	
do	15.63 [m]	—	12/12/52	J,E	—	—	—	D	—	
Schist-gabbro contact	8	—	1947	J,E	—	—	—	D	—	Quicksand at 25 ft.; rock at 90 ft.; jet at 110 ft.
Schist	28	—	12/12/52	J,E	—	—	—	D	—	
do	21	—	12/12/52	S,E	—	—	—	F	—	Goes dry occasionally
do	13	—	12/12/52	S,E	—	—	—	D	—	Water reported somewhat irony. Goes dry frequently.
do	—	—	—	J,E	—	—	—	F	—	

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ad 33	Alfred Crothers	—	—	365	Dug	34	48	—	0
Ad 34	Do	—	Old	365	do	36	48	—	0
Ad 35	Maurice Brown	R. Meyers	1927	335	Drilled	75	10	—	0
Ad 36	Elwood Foster	F. H. Dougherty	1953	390	do	70	6	62	0
Ad 37	George Prettyman	G Rinier	1949	385	do	52	6	30	0
Ad 38	Willis Rogers	R. W. Slauch & Sons	1953	430	do	104	6	73	0
Ad 39	James Mendenhall	do	1941	430±	do	114	—	—	0
Ae 1	Albert Moore	do	1951	380	do	60	6	44	0
Ae 2	William Simmons	B. F. Miller	1952	350	do	55	6	55	0
Ae 3	Rock Presbyterian Church	R. W. Slauch & Sons	1951	230	do	43	6	38	0
Ae 4	Arthur A. Mackie	do	1951	245	do	104	6	20	0
Ae 5	Harold Strahorn	do	1950	360	do	59	5⅝	34.8	0
Ae 6	Price Blackson	do	1951	360	do	98	5⅝	50	0
Ae 7	A. E. Stetson	do	1951	360	do	105	5⅝	45	0
Ae 8	Pleasant Hill School	do	1952	390	do	40	6	33	0
Ae 9	J. L. Nowland	—	Before 1872	320	Dug	16	48	—	0
Ae 10	W. Du Pont	—	—	335	do	40(?)	—	—	0
Ae 11	Miles	—	Old	385	do	—	54	—	0
Ae 12	L. M. Crouse	—	1925	280	Drilled	84	6	—	0
Ae 13	Arthur Crouse	—	Old	300	Dug	30(?)	—	—	0
Ae 14	C. A. Janney	—	1951	340	do	13	42	—	0
Ae 15	Elton Moran	—	Old	340	do	27	42	—	0
Ae 16	Do	—	do	345	do	18	40	—	0
Ae 17	E. Ray Pugh	—	—	390	do	42	48	—	0
Ae 18	Do	—	—	385	Spring	—	—	—	—
Ae 19	Wilbert Kelly	—	—	390	Dug	20	48	—	0
Ae 20	Walter Henderson	—	1850	190	do	33	42	—	0
Ae 21	J. McFadden	—	—	225	Spring	—	—	—	—
Ae 22	Walter S. Moore	R. Meyers	1932	380	Dug & Drilled	73	6	—	0
Ae 23	George Kirk	—	1800	380	Dug	28	48	—	0
Ae 24	Do	R. W. Slauch & Sons	1948	380	Dug & Drilled	75	6	—	0
Ae 25	Linton Truitt	do	1952	330	Drilled	115	6	14	0
Ae 26	Do	—	—	330	Dug	34	30	—	0
Ae 27	Valley Green Farms	—	—	260	Spring	—	—	—	—
Ae 28	Mitchell Smith	E. Smith	1951	360	Dug	20±	42	—	0
Ae 29	Fair Hill, Inc.	R. W. Slauch & Sons	1952	355	Drilled	52	6	20	0
Ae 30	Do	do	1953	325	do	223	6	24	0
Ae 31	Do	—	Old	325	Dug	31	40	—	0

—*Continued*

Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Granodiorite	25	—	12/12/52	S,E	—	—	—	D	—	
do	30	—	12/1/52	—	—	—	—	F	—	Water reported irony, hard.
Granodiorite	25	—	1937	J,E	—	—	—	D,F	—	
Schist-gabbro contact	18	55	1/28/53	J,E	15	1/28/53	.4	D	—	See driller's log.
do	10	—	11/30/49	J,E	—	—	—	D	—	
Schist	12	90	6/9/53	J,E	9	6/9/53	.1	D	—	Well gravel-packed. See driller's log.
do	—	—	—	—	—	—	—	D	58	See chemical analysis. Field test: Fe 0.0 ppm, H 54 ppm, pH 7.
do	20	40	9/3/51	J,E	15	9/3/51	.8	D	58	Water reported slightly hard.
do	20	30	4/15/52	J,E	5	4/15/52	.5	D	—	Static level 9.09 ft. below land surface, 9/8/52.
Schist-gabbro contact	20	25	8/28/51	—	15	8/28/51	3.0	D	—	
Granodiorite	25	90	10/1/51	J,E	4	10/1/51	<.1	D	—	Water reported slightly hard. See driller's log.
do	19	—	11/3/50	J,E	5	11/3/50	—	D	—	Supplies two houses. See driller's log.
do	30	70	4/18/51	J,E	10	4/18/51	.3	D	—	
do	40	60	6/12/51	J,E	5	6/12/51	.3	D	—	See driller's log.
do	11	20	7/17/52	—	12	7/17/52	1.3	S	—	Do
do	10	—	11/5/52	S,E	—	—	—	D,F	—	
Schist	—	—	—	J,E	—	—	—	D,F	—	
do	—	—	—	S,H	—	—	—	D	—	
do	9	—	4/—/52	C,E	—	—	—	D,F	—	
do	—	—	—	S,E	—	—	—	D,F	—	
do	7	—	11/—/52	J,E	—	—	—	D	—	
Gabbro-granodiorite contact	20.47 [m]	—	11/17/52	J,E	—	—	—	D	—	
do	14	—	11/17/52	J,E	—	—	—	F	—	Water used for stock in winter.
Granodiorite	—	—	—	N	—	—	—	N	—	Frequently dry.
do	—	—	—	J,E	8–10	11/17/52	—	D	—	Steady; never dry.
do	14.23 [m]	—	11/17/52	S,H	—	—	—	D	—	
do	25	—	11/1/52	C,H	—	—	—	D,F	—	
do	—	—	—	S,E	—	—	—	D	—	Frequently dry
do	35	—	12/10/52	J,E	—	—	—	D,F	—	Drilled through bottom of dug well.
do	18	—	12/10/52	S,E	—	—	—	D	—	
do	—	—	—	J,E	—	—	—	F	—	Do
do	40	50	10/29/52	J,E	15	10/29/52	1.5	D,F	—	See driller's log.
do	22	—	12/10/52	N	—	—	—	N	—	
do	—	—	—	—	—	—	—	F	—	Used for growing mushrooms. Steady flow.
do	—	—	—	J,E	—	—	—	D	54.5	
do	8	45	12/11/52	S,E	5	12/11/52	.1	D	—	
do	23	200	1/20/53	J,E	5	1/20/53	<.1	N	—	Water reported very irony. See driller's log.
do	19.14 [m]	—	4/8/53	C,H	—	—	—	D,F	—	Water used in place of Ae30.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ae 32	H. W. Strahorn, Jr.	R. W. Slauch & Sons	1953	385	Drilled	116	6	32	0
Ae 33	Harry W. Nock	Van Trump Well Drillers Inc.	—	330	Dug & Drilled	118	6	38.5	0
Af 1	Stuart Greer	John Auld	1952	250	Drilled	60	6	50	0
Af 2	Dundee Corporation	do	1952	250	do	58	6	—	0
Af 3	Clarence Phillips	R. W. Slauch & Sons	1951	300	do	85	5⅝	61	0
Af 4	Earl Cockerham	do	1952	300	do	94	5⅝	38	0
Af 5	J. F. Rickey	—	—	280	Dug	45	60	—	0
Af 6	B. Badders	—	Before 1900	360	do	54	48	—	0
Af 7	W. DuPont	—	Before 1853	330	do	35	48	—	0
Af 8	T. Coveliskie	Ennis Brothers	1952	300	Drilled	41	6	22	0
Af 9	B. Gravell	—	—	180	Spring	—	—	—	—
Af 10	Joseph W. Zebley	—	Old	225	Dug	14	45	—	0
Af 11	Do	—	—	230	do	32	42(?)	—	0
Af 12	Charles Haller	—	—	230	do	20	42	—	0
Af 13	Wylie Snodgrass	—	Old	230	do	30(?)	42	—	0
Af 14	E. F. Hall	—	do	140	do	38	42	—	0
Af 15	R. Osborne	—	do	140	do	30	42	—	0
Af 16	Do	—	do	135	do	30	30	—	0
Af 17	David Cronhardt	—	do	209	do	30	38(?)	—	0
Af 18	William Dever	—	do	185	do	24	60	—	0
Af 19	W. Philhower	—	do	150	do	17	60(?)	—	0
Af 20	F. B. Martenis	—	1890	300	do	18	48	—	0
Af 21	Do	—	1890	290	do	17	48–36	—	0
Af 22	Donald Criddle	—	—	230	do	—	—	—	0
Af 23	A. M. Baylis	Ennis Brothers	1947	280	Drilled	59	6	—	0
Af 24	David Meyer	L. T. Walton	1953	230	do	65	6	60	0
Bb 1	E. J. Luglio	R. W. Slauch & Sons	1951	460	do	129	6	112	0
Bb 2	Walter Buck	B. F. Miller	1952	460	do	84	6	83	0
Bb 3	Do	do	1952	460	do	74	6	73	0
Bb 4	E. G. Robichand	do	1951	460	do	92	6	—	0
Bb 5	H. A. Lee	do	1951	450	do	77	6	—	0
Bb 6	C. L. Pugh	S. D. Smith	1951	380	do	36	6	19	0
Bb 7	Clyde McMullen	F. H. Dougherty	1952	460	do	79	6	57	0
Bb 8	Wm. Webb	H. G. Thomas	1952	440	do	117	6	52	0
Bb 9	Spencer Murphy	L. H. Brown	—	120	do	23	6	16	0
Bb 10	Wiley Graybeal	H. Morgan	1950	40	do	49	6	22.5	0
Bb 11	Paul White	F. H. Dougherty	1953	340	do	65	6	47	0
Bb 12	James Caldwell	James Caldwell	1947	220	Dug	20	28	—	0
Bb 13	J. D. McGlothlin	—	—	280	Spring	—	—	—	—

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Water-bearing unit	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield: Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Granodiorite	29	110	2/5/53	NI	5	2/5/53	<.1	D	—	See driller's log.
do	30	100	6/1/49	J,E	2.5	6/1/49	<.1	D	—	Deepened 1949. Water reported slightly hard. See driller's log.
Schist	18	25	2/7/52	J,E	10	2/7/52	1.4	D	—	See driller's log.
do	8	18	2/7/52	—	10	2/7/52	1.0	D	—	
Gabbro	30	70	4/19/51	J,E	15	4/19/51	.4	D	—	
do	14	20	7/11/52	NI	—	—	—	D	—	See driller's log. Static level 16.84 ft. below land surface, 9/8/52.
Schist	43	—	11/5/52	C,E	—	—	—	D,F	—	Has never gone dry.
do	36	—	11/4/52	C,H	—	—	—	D,F	—	Has never gone dry in 41 years.
do	—	—	—	C,H	—	—	—	D	—	Water reported good. Has not failed in 11 years.
Gabbro	15	33-	9/16/52	NI	20	9/16/52	1.1	D	—	
Granodiorite	—	—	—	—	10	11/5/52	—	D,F	—	Gravity flow to house.
do	11	—	11/18/52	J,E	—	—	—	D	—	Water reported somewhat irony.
do	—	—	—	J,E	—	—	—	F	—	Goes dry.
do	13.81[m]	—	11/18/52	S,E	—	—	—	D	56	Reported slightly irony and hard.
do	—	—	—	J,E	—	—	—	D	—	
do	28.29[m]	—	11/18/52	J,E	—	—	—	D	53	
do	26.62[m]	—	11/18/52	N	—	—	—	N	55	Low at times.
do	21.54[m]	—	11/18/52	J,E	—	—	—	D	54	
do	—	—	—	J,E	—	—	—	D	—	Dry in 1947. Water reported hard.
do	18.40[m]	—	11/18/52	J,E	—	—	—	D,F	54	Water reported slightly irony.
do	10	—	11/18/52	S,H	—	—	—	D	—	
do	15	—	11/—/52	S,E	—	—	—	D	—	Dry in 1934.
do	14	—	11/—/52	S,E	—	—	—	F	—	Dry at times.
—	—	—	—	S,H	—	—	—	D	—	
Schist	30	50	12/—/47	J,E	4	12/—/47	.2	D	—	
Gabbro	0	15	5/6/53	J,E	5	5/6/53	.3	D	—	Reported hard. See driller's log.
Patuxent(?)	18	—	5/24/51	J,E	10	5/24/51	—	D	—	See driller's log.
do	20	40	2/18/52	—	5	2/18/52	.3	D	—	
Granodiorite	20	40	2/25/52	—	5	2/25/52	.3	D	—	
do	36	—	8/31/51	—	8	8/31/51	—	D	—	Do
Patuxent(?)	30	40	12/18/51	NI	10	12/18/51	1.0	D	—	Do
Granodiorite	12	20	9/10/51	S,E	15	9/10/51	1.9	D	—	Do
do	15	65	6/30/52	J,E	8	6/30/52	.2	D	—	Do
do	64	110	1/2/52	J,E	1.3	1/2/52	<.1	D	—	See driller's log. Supplies two families
do	15	18	1/16/53	S,H	8	1/16/53	2.7	D	—	
do	15	30	4/25/53	J,E	9	4/25/53	.6	D	—	See driller's log.
Schist-Granodiorite contact	30	45	1/13/53	NI	20	1/13/53	1.3	D	—	See driller's log. Static level 25.32 ft. below land surface, 4/14/53.
Schist	14	—	Summer, 1949	S,E	—	—	—	D	—	
Granodiorite	—	—	—	—	7	4/16/53	—	D	—	Steady flow

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bb 14	George Cox	—	—	310	Dug	28	24	—	0
Bb 15	Do	—	—	315	Drilled	80(?)	6	—	0
Bb 16	Pennsylvania R. R.	—	—	60	Spring	—	—	—	—
Bb 17	Fred Narvel	Hess	1935	70	Drilled	28	6	—	0
Bb 18	Thomas McLay	F. H. Dougherty	1953	400	do	80	6	63	0
Bb 19	Walter Burlin	do	1952	380	do	105	6	72.5	0
Bb 20	Arthur Benjamin	—	—	380	Spring	—	—	—	—
Bb 21	Wiley Mgf. Co.	F. H. Dougherty	1953	15	Drilled	24	6	24	0
Bb 22	Stanley Wills	do	1953	15	do	27	6	27	0
Bb 23	Donaldson Brown	—	—	170	Spring	—	—	—	—
Bb 24	F. D. Brown	—	—	260	do	—	—	—	—
Bb 25	J. H. Kimble	Downin	1930	320	Drilled	100+	6	—	—
Bb 26	W. L. Bannister	J. Dabler	1911	180	do	40	6	—	0
Bc 1	Addison Freeman	L. H. Brown	1950	320	do	50	6	47	0
Bc 2	B. E. Boyd	F. H. Dougherty	1952	460	do	98	6	38	0
Bc 3	A. C. Sherrard	B. F. Miller	1951	440	do	84	6	—	0
Bc 4	L. C. Young	F. H. Dougherty	1952	360	do	55	6	34	0
Bc 5	T. B. Gutteron	do	1952	350	do	52	6	41	0
Bc 6	Michael Shmel	do	1952	390	do	50	6	30	0
Bc 7	Norris Astle	do	1952	330	do	59	6	30	0
Bc 8	Charles Moore, Jr.	H. &. H. Drilling Co.	1952	360	do	43	6	38	0
Bc 9	J. L. Poffenbarger	R. W. Slauch & Sons	1952	360	do	209	6	51	0
Bc 10	Do	do	1951	360	do	226	6	—	0
Bc 11	D. E. Jackson	F. H. Dougherty	1952	290	do	58	6	15	
Bc 12	Mrs. G. Clement	H. Morgan	1950	325	do	70+	6	63	0
Bc 13	R. McFadden	G. Rinier	1950	160	do	38	6	27	0
Bc 14	L. A. Baldwin	H. A. Thomas	1952	400	do	91	6	58	0
Bc 15	Guy Kirk	H. Morgan	1950	310	do	100	6	44	0
Bc 16	West Nottingham Academy	G. Rinier	1950	340	do	85	6	72	0
Bc 17	Walter Pitt	—	—	325	Spring	—	—	—	—
Bc 18	Ebenezer Community House	—	1826	445	Dug	25	42	—	0
Bc 19	Glenn McGrady	—	Old	390	do	26	42	—	0
Bc 20	Do	—	do	390	do	26	42	—	0
Bc 21	J. F. Fox	—	1938	360	Drilled	105	6	—	0
Bc 22	Rush M. Nickell	—	Old	420	Dug	35	42		

—Continued

Water-bearing unit	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Granodiorite	18.02 m	—	4/18/53	J,E	—	—	—	D	—	
do	15	—	1948	J,E	—	—	—	D	—	
do	—	—	—	—	6–7	4/17/53	—	D	—	Supplies three families.
do	—	—	—	S,E	—	—	—	D	—	
Schist	17	65	4/11/53	J,E	10	4/11/53	.5	D	—	
do	25	98	9/30/52	J,E	5	9/30/52	<.1	D	—	
Granodiorite	—	—	—	S,E	3	9/21/52	—	C	—	Trailer Camp: 25 trailers. Contact spring.
do	7	9	5/29/53	J,E	50	5/29/53	25.0	C	—	Drilled in bank of Susquehanna River. Water reported brackish. Used for air conditioning. See driller's log.
do	5	5.5	6/17/53	S,E	30	6/17/53	60.0	C	—	Drilled at edge of Susquehanna River. Water bad. Used to keep live bait for fishing. See driller's log.
Metadacite-granodiorite-contact	—	—	—	T,E	17	1953	—	D	—	Flows 24,000 gallons a day average. 18,000 gallons in October; 40,000 gallons in spring.
Granodiorite	—	—	—	S,E	10	1953	—	D	—	Supplies three houses.
Schist	—	—	—	C,E	—	—	—	D,F	—	
Granodiorite	3	—	1942	S,E	—	—	—	D	—	
Schist-gabbro Contact	18	30	9/11/50	J,E	20	9/11/50	1.7	D,F	—	See driller's log.
Metadacite	37	90	1/31/52	C,H	7	1/31/52	.1	D	—	
Granodiorite	36	50	10/11/51	J,E	16	10/11/51	1.1	C	—	Trailer camp.
Granodiorite-Schist contact	10	50	7/10/52	NI	5	10/7/52	.1	D	56	Static level 11.64 ft. below land surface, 10/16/52.
do	10	15	7/19/52	NI	25	7/19/52	5.0	D	—	See driller's log. Static level 18.35 below land surface, 10/15/52.
Granodiorite	10	40	6/18/52	J,E	10	6/18/52	.3	D	—	See driller's log.
do	32	40	6/6/52	J,E	10	6/6/52	1.2	D	—	Do
do	23	35	1/29/52	—	6	1/29/52	.5	D	—	Do
Metadacite	15	—	3/20/52	C,E	6	3/20/52	—	C	—	Garage. Water at 40 feet.
do	24	70	12/7/51	C,E	10	12/7/51	.2	C	—	Store, gas station. Water reported slightly hard.
do	12	26	2/11/52	J,E	10	2/11/52	.7	D	—	Apartments. See driller's log.
do	50	—	5/21/50	J,E	9	5/21/50	—	D	59	See driller's log.
do	8	—	4/29/50	C,E	20	4/29/50	—	D	—	
do	28	85	1/29/52	NI	1	1/29/52	<.1	D	—	Do
do	40	75	1/18/50	J,E	8	1/18/50	.2	D,F	—	
Granodiorite	14	—	9/8/50	J,E	12	9/18/50	—	S	—	
do	—	—	—	N	.5	4/17/52	—	D	—	Does not flow in summer. Seepage spring.
Schist	18.09 m	—	9/10/53	S,E	—	—	—	S	—	
do	18	—	8/—/53	S,E	—	—	—	D	—	Water reported irony. Went dry; then deepened.
do	—	—	—	S,E	—	—	—	D,F	—	Low at times.
Granodiorite-Schist contact	20	—	1938	C,E	—	—	—	D,F	—	Field test; Fe 0.0 ppm, H 34 ppm, pH 6.7.
do	—	—	—	S,E	—	—	—	D	—	

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bc 23	Ralph McGlothlin	F. H. Dougherty	1952	390	Drilled	42	6	23	0
Bc 24	Charles Stotts	do	1952	350	do	54	6	40	0
Bc 25	J. H. Drennen	G. Rinier	1953	300	do	43	6	—	0
Bc 26	E. D. Waring	F. H. Dougherty	1952	280	do	52	6	30	0
Bc 27	Jack Frost	G. Rinier	1949	300	do	42	6	25	0
Bc 28	O. B. Smith	F. H. Dougherty	1953	200	do	69	6	47	—
Bc 29	Edith Black	S. D. Smith	1949	160	do	94	6	63	0
Bc 30	M. E. Brown	—	—	430	Spring	—	—	—	—
Bc 31	Fred Loving	—	—	400	Dug	27	42	—	0
Bc 32	Dale Keller	—	—	275	Spring	—	—	—	—
Bc 33	V. I. Farrell	F. H. Dougherty	1952	390	Drilled	55	6	48	—
Bc 34	Helen Banks	do	1953	390	do	60	6	51	0
Bc 35	Garrett Blackburn	B. F. Miller	1949	400	do	132	6	—	0
Bc 36	J. B. Campbell	G. Rinier	1949	390	do	139	6	86	0
Bc 37	James Gaddy	H. Morgan	1949	360	do	36	6	—	0
Bc 38	J. L. Poffenbarger	L. H. Brown	1953	460	do	51	$5\frac{5}{8}$	49	0
Bc 39	Harry Labhart	B. F. Miller	1951	450	do	110	6	—	0
Bc 40	Stella Meek	—	Old	400	Dug	14	40	—	0
Bd 1	C. R. Brown	G. Rinier	1951	80	Drilled	39	6	10	0
Bd 2	Frank C. Moroney	do	1952	80	do	56	6	28	0
Bd 3	Deerdale Motel	do	1952	80	do	53	6	40	0
Bd 4	Do	S. D. Smith	1949	80	do	58	6	—	0
Bd 5	Frank Daly	G. Rinier	1951	75	do	53	6	45	0
Bd 6	Herman Ross	L. H. Brown	1952	330	do	65	6	45	0
Bd 7	Zane Monscevity	do	1952	370	do	63	6	—	0
Bd 8	Lester C. Brooks	do	1952	350	do	26	6	18	0
Bd 9	Herb L. Cornwall	do	1950	360	do	40	6	—	0
Bd 10	Robert Spotswood	do	1952	380	do	50+	6	18	0
Bd 11	C. R. Brown	G. Rinier	1952	80	do	78	6	40	0
Bd 12	Allen Carlson	R. W. Slauch & Sons	1952	85	do	192	6	106	0
Bd 13	L. C. Simpers	do	1951	40	do	90	6	60	0
Bd 14	D. C. Cole	G. Rinier	1952	70	do	79	6	34	0
Bd 15	E. Sakers	do	1951	30	do	57	6	33	0
Bd 16	A. Kallio	Ennis Brothers	1952	170	do	145	6	63.5	0
Bd 17	Do	do	1952	180	do	80	6	64	0
Bd 18	Town of North East	Washington Pump & Well Co.	1948	25	do	195	8	36	—
Bd 19	Do	do	1948	30	do	210	10	55	—

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Water-bearing unit	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Granodiorite	10	39	10/3/52	J,E	3	10/3/52	0.1	D	—	
Granodiorite-schist contact	18	24	8/29/52	J,E	20	8/29/52	3.3	D	—	See driller's log.
Patuxent(?)	—	—	—	J,E	—	—	—	D	—	Gravel packed. Well pumped sand.
Metadacite	25	47	9/5/52	J,E	5	9/5/52	.2	D	—	See driller's log.
do	20	—	7/13/45	J,E	10	7/13/45	—	D	—	
Patuxent	21	45	2/5/53	J,E	20	2/5/53	.8	D	—	Static level 26.15 ft. below land surface, 9/16/53. See driller's log.
Metadacite	18	30	9/6/49	J,E	9	9/6/49	.8	D	—	See driller's log
Schist-granodiorite contact	—	—	—	N	—	—	—	D	—	No noticeable flow. Never dry. Seepage spring.
Bryn Mawr gravel	22.60 m	—	9/21/53	J,E	—	—	—	D	—	
Schist	—	—	—	N	1.5	9/21/53	—	D	—	Never dry. Rock fracture.
Patuxent	27.5	44	9/22/52	J,E	7	9/22/52	.4	D	—	Gravel packed.
do	22	56	6/13/53	NI	2.5	6/13/53	<.1	D	—	See driller's log.
Metadacite	64	100	2/7/49	J,E	2	2/7/49	<.1	D	—	Do
Granodiorite	30	—	4/6/45	J,E	1	4/6/45	—	D	—	No water in the 86 feet of gravel.
Metadacite	18	18.5	1/3/49	J,E	10	1/3/49	20.0	D	—	Static level 24.80 ft. below land surface, 9/22/53.
Bryn Mawr-Patuxent(?)	16	30	2/10/53	J,E	5	2/10/53	.4	C	—	Store. See driller's log.
Metadacite	40	—	9/7/51	NI	2.5	9/7/51	—	D	—	
Granodiorite	6.20 m	—	9/23/53	C,E	—	—	—	D	—	
do	6	—	10/6/51	J,E	8	10/6/51	—	C	—	Gas station. Water reported irony.
do	10	—	5/26/52	J,E	12	5/26/52	—	C	—	Motel.
do	15	—	8/20/52	J,E	8	8/20/52	—	C	—	Water cloudy. 5000 gpd.
do	22	50	10/8/49	J,E	11	10/8/49	.4	C	—	Water poor, very irony.
do	15	—	5/29/51	J,E	6	5/29/51	—	C	—	Motel. Water hard; Permutit filter 700 gpd
Metadacite	35	46	1/5/52	C,H	8	1/5/52	.7	D	—	Water fair, irony. See driller's log.
Granodiorite	23	42	7/7/52	J,E	6	7/7/52	.3	D	—	See driller's log.
do	12	15	2/20/52	J,E	20	2/20/52	7.0	D	—	Do
do	15	20	4/15/50	J,E	20	4/15/50	4.0	D	—	Do
do	30	50	2/4/52	J,E	4	2/4/52	.2	D	—	Do
do	20	—	9/8/52	NI	7	9/8/52	—	C	—	Gas station.
do	50	100	4/21/52	J,E	5	4/21/52	.1	D	—	Water reported irony. See driller's log.
do	23	45	2/6/51	—	15	2/6/51	.7	D	—	See driller's log.
do	15	—	8/16/52	J,E	5	8/16/52	—	C	—	
do	20	—	10/3/51	N	5	10/3/51	—	N	—	Well abandoned. Use town water. See driller's log
do	14	100	6/4/52	N	.8	6/5/52	<.1	N	—	Water reported poor: Inadequate supply. See driller's log.
do	14	50	5/7/52	S,E	4	5/7/52	.1	D	—	Water reported poor, very irony. See driller's log.
do	11.68 m	—	7/9/52	T,E	38.5	7/9/52	—	P	65	
do	11.33 m	—	7/9/52	T,E	34	7/9/52	—	P	—	See chemical analysis.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bd 20	Town of North East	Washington Pump & Well Co,	1948	5±	Drilled	90	8	0	0
Bd 21	Do	do	1948	5±	do	90±	8	—	—
Bd 22	Do	Ennis Brothers	1951	5±	do	70	8	0	0
Bd 23	Do	do	1951	10±	do	65	6	46	12
Bd 24	Smith	Washington Pump & Well Co.	—	20	do	104	6	20	—
Bd 25	Demering	—	—	25±	Dug	16	36	—	0
Bd 26	George H. Ashbridge	F. B. Rogers	1946	92	Drilled	99	6	96	0
Bd 27	J. C. Calloway	Ennis Brothers	1953	70	do	88	6	70.5	0
Bd 28	John D. Spence	do	1953	70	do	74	8	56	0
Bd 29	Philip Umstadter	do	1952	80	do	107	6	45.5	0
Bd 30	Charles Larimore	F. H. Dougherty	1953	80	do	74	6	74	0
Bd 31	Margaret Klessig	Ennis Brothers	1952	40	do	104	6	55	0
Bd 32	Esa Westerinen	—	—	260	Spring	—	—	—	—
Bd 33	Do	—	—	260	do	—	—	—	—
Bd 34	Do	—	—	260	do	—	—	—	—
Bd 35	H. Fristoe	F. H. Dougherty	1952	325	Drilled	24	6	—	0
Bd 36	C. B. Silver & Son Co.	—	1930	150	do	165	5⅝	30	0
Bd 37	Do	—	1932, 1940	150	do	210	5⅝	30	0
Bd 38	Do	—	1940	150	do	100	6	—	—
Bd 39	Do	—	—	150	do	50	6	—	—
Bd 40	Earle Armour	Davis	—	240	Dug	16	40	—	0
Bd 41	Reginal Weaver	—	1948	260	Drilled	45	6	—	0
Bd 42	Lyman Smith	—	Old	360	Dug	27	40(?)	—	0
Bd 43	K. Brown	—	do	320	do	25	36	—	0
Bd 44	H. L. Schneider	—	do	350	do	65	42	—	0
Bd 45	Henry H. Heath, Sr.	—	1850	90	do	15	36	—	0
Bd 46	Harry Gamble	Harry Gamble	1951	365	do	16	36	—	0
Bd 47	Charles Hudson	—	—	385	do	30	36	—	0
Bd 48	Harold Jackson	Harold Jackson	1951	280	do	12	36	—	0
Bd 49	Aili Oikomus	Frederick	1951	230	do	20	36	—	0
Bd 50	Henry Farer	—	1953	100	do	20	36	—	0
Bd 51	Do	Ennis Brothers	1952	100	Drilled	40	6	38.5	0
Bd 52	Do	do	1952	100	do	30	6	—	0
Bd 53	Texaco Gas Station	Hendrix(?)	1951	120	Dug	45	36	—	0
Bd 54	Ellis Todd	—	1913(?)	140	do	22	48	—	0
Bd 55	H. Simpers	H. Simpers	1940	140	do	22	36	—	0

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Water-bearing unit	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Granodiorite	—	—	—	N	65	—	—	N	—	Water cloudy.
do	—	—	—	N	—	—	—	N	—	Do
do	—	—	—	N	—	—	—	N	—	Do
Patapsco	5.50[m]	—	7/9/52	T,E	34	—	—	P	—	Gravel-packed. See driller's log and chemical analysis.
Granodiorite	10.22[m]	—	7/9/52	T,E	66	—	—	P	—	See chemical analysis.
Talbot	5.21[m]	—	1/27/53	C,H	—	—	—	N	—	
Potomac group	35	—	10/14/46	J,E	15	10/14/46	—	D	57	Filter system. See driller's log.
Granodiorite	37	—	5/22/53	NI	—	—	—	C	—	Gas station.
do	10.5	50	4/30/53	J,E	12	4/30/53	.3	C	—	Trailer part. See driller's log. Water reported irony.
do	14	—	10/24/53	J,E	—	—	—	C	—	Motel. See driller's log.
Patuxent	16.5	60	5/11/53	S,H	20	5/11/53	.5	D	56.5	See driller's log. Static level 16.27 ft. below land surface, 8/11/53.
Granodiorite	20	40	9/23/52	—	6	9/23/52	.3	D	—	See driller's log.
Brandywine	—	—	—	—	1	8/12/53	—	D	59	Never dry. Supplies two houses. Seepage spring.
do	—	—	—	—	6	8/12/53	—	D	58	Do
do	—	—	—	S,E	3	8/12/53	—	D	60	Never dry. Seepage spring.
Metadacite	15	20	12/9/52	S,E	5	12/9/52	1.0	D	—	See driller's log.
do	—	—	—	T,E	42	8/13/53	—	C	—	Cannery. Flows during off season.
do	—	—	—	C,E	3-4	8/13/53	—	C	—	Cannery. Cooling. Water from 30 feet.
do	—	—	—	J,E	3-4	8/13/53	—	C	—	Cannery.
do	12	—	8/13/53	J,E	3-4	8/13/53	—	C	—	Cannery. Office use.
Brandywine	—	—	—	S,E	—	—	—	D	—	
Granodiorite	—	—	—	J,E	—	—	—	D,F	—	
Metadacite	12.30[m]	—	8/13/53	S,E	—	—	—	D,F	62	
Granodiorite-metadacite contact	19.65[m]	—	8/13/53	—,E	—	—	—	D,F	62	
Granodiorite	—	—	—	J,E	—	—	—	D,F	—	
Wicomico	12.5	—	8/13/53	S,E	—	—	—	D	—	Gets very low at times.
Bryn Mawr gravel	14	—	9/—/53	J,E	—	—	—	D	—	Dug wells source of supply for Bay View.
Granodiorite	27	—	8/—/53	J,E	—	—	—	D	—	Low at times.
Patuxent	9	—	1951	S,E	—	—	—	D	—	
do	18	—	8/—/53	J,E	—	—	—	D	—	Very low at times.
Patapsco	14.07[m]	—	9/9/53	J,E	—	—	—	C	—	Motel. Water reported irony.
Granodiorite	—	—	—	N	—	—	—	N	—	No water encountered; well abandoned. See driller's log.
do	—	—	—	N	—	—	—	N	—	No water encountered; well abandoned.
Patapsco	10	—	1951	J,E	—	—	—	C	—	Chiefly variegated clay.
Sunderland	20.5	—	11/27/53	S,E	—	—	—	D	—	Reported to go dry when cannery is operated.
do	18	—	11/27/53	S,E	—	—	—	D	—	Never completely dry. Clay, then sand and gravel.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bd 56	Frank Wood	—	Old	60	Dug	40	36	—	0
Bd 57	J. Novokny	—	—	60	Spring	—	—	—	—
Bd 58	Elmer Puro	R. W. Slauch & Sons	1945	60	Drilled	50	6	—	—
Bd 59	Charles Puschell	Charles Puschell	—	110	Dug	18	36	—	—
Bd 60	Rudolph Leeman	—	Old	180	do	22	36	—	0
Bd 61	James Cullen	Ennis Brothers	1953	5	Drilled	74	6	68	5
Bd 62	Walter Henson	H. Morgan	1949	65	do	175	6	142	—
Bd 63	Town of North East	G. Rinier	1954	10	do	168	6	149	—
Bd 64	Do	—	1951	15	do	—	—	—	—
Be 1	Board of Education	R. W. Slauch & Sons	1952	235	do	73	5⅝	34	0
Be 2	Franklin Ganzmann	L. H. Brown	1952	220	do	110	5⅝	40	0
Be 3	John Erickson	H. Morgan	1949	140	do	32	6	26	0
Be 4	Board of Education	R. W. Slauch & Sons	1952	220	do	65	6	54	0
Be 5	Arnold Carroll	do	1950	110	do	65	6	61	0
Be 6	Howard Sapp	J. N. Unruh	1951	100	do	108	4	100	8
Be 7	Frank Conway	G. Rinier	1950	85	do	151	6	149	0
Be 8	Eugene Bowers	do	1951	120	do	85	6	75	5
Be 9	George Justice	L. T. Walton	1952	100	do	115	6	69	0
Be 10	Clyde Adkins	—	—	360	Dug	23	42	—	0
Be 11	Hattie Simpers	—	Old	265	do	45	54	—	0
Be 12	W. A. Lusby	—	do	270	do	35	36	—	0
Be 13	Lester Pugh	—	1949	320	do	14	42	—	0
Be 14	Paul Smith	—	Old	190	do	22	36	—	0
Be 15	William Price	—	—	160	do	35	48	—	0
Be 16	John Truitt	R. W. Slauch & Sons	1952	215	Drilled	39	6	16	0
Be 17	Arundel Corporation	—	—	10±	Dug	13	48	—	—
Be 18	State Roads Commission	Ennis Brothers	1947	30	Drilled	63	6	—	10
Be 19	Ira Lee	—	—	100	Dug	29	38	—	0
Be 20	Bay Shore Industries, Inc.	Parkhurst	1942	23	do	22	72	—	—
Be 21	Do	do	1942	24	do	22	72	—	—

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Water-bearing unit	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
—	—	—	—	S,E	—	—	—	D	—	Never completely dry. Low in 1953.
Patuxent-granodiorite contact	—	—	—	S,E	—	—	—	D	—	No noticeable flow. Never dry. Contact spring.
Granodiorite(?)	Near surface	—	—	J,E	3	—	—	D	—	Reported hard and irony. 20 feet dirt, 30 feet rock.
do	16	—	11/27/53	S,H	—	—	—	D	—	Reported cloudy. Rock reported at 20 feet.
do	16	—	11/27/53	S,E	—	—	—	D	—	Reported hard. Rock at 22 feet.
Patapsco	6	—	1/6/53	J,E	—	—	—	D	—	Water reported irony. See driller's log.
do	20	130	7/20/49	J,E	5	7/20/49	<.1	D	—	Water reported irony. Filter used. Gravel packed.
Granodiorite	—	—	—	—	30	Summer 1954	—	P	—	See chemical analysis. Church Point Lane.
do	—	—	—	—	30	—	—	N	—	
do	12	—	8/22/52	N1	—	—	—	S	—	See driller's log.
do	12	65	7/14/52	J,E	5	7/14/52	.1	C	—	Store, gas station. Water reported poor, very irony.
do	22	24	12/15/49	J,E	5	12/15/49	2.5	D,F	—	
do	30	—	8/1/52	N1	15	8/1/52	—	S	—	
do	15	—	11/16/50	J,E	—	—	—	D	—	See driller's log.
Patuxent	81	95	9/—/51	J,E	10	9/—/51	.7	D	—	Do
Potomac group	80	—	2/15/50	J,E	—	—	—	D	—	Pumps sand and shells. Supplies seven families. See driller's log.
do	20	—	9/5/51	J,E	—	—	—	D	—	See driller's log.
Granodiorite	35	90	10/4/52	C,H	4	10/4/52	<.1	D	—	Reported slightly irony. Supplies two families. See driller's log.
do	12.90 m	—	12/9/52	S,E	—	—	—	D	—	
Patuxent	13	—	12/9/52	S,E	—	—	—	D	—	
do	25.72 m	—	12/9/52	C,E	—	—	—	D,F	—	
do	3.62 m	—	12/9/52	S,H	—	—	—	D	—	Reported unfit for drinking.
do	16.54 m	—	12/10/52	S,E	—	—	—	D	—	
Granodiorite	30.82 m	—	12/10/52	B,H	—	—	—	D	—	Low at times.
do	24	28	11/22/52	NI	10	11/22/52	2.5	D	—	Static level 20.88 ft. below land surface, 4/8/53. See driller's log.
Talbot	12.65 m	—	7/14/53	—,E	—	—	—	D	—	Supplies four houses.
Patapsco	18	60	5/16/47	—,E	18	5/16/47	.4	C	57	State Roads Comm. barracks See chemical analysis.
Sunderland	26.26 m	—	7/29/53	C,E	—	—	—	D	60	
Talbot	—	18.55 m	2/22/43	C,E	—	—	—	N	48	Reported hardness 26 ppm, pH 7.9. Reported static level 6 ft. below land surface, summer, 1942.
do	—	18.35 m	2/22/43	T,E	—	—		N	48	Reported static level 6 ft. below land surface, summer, 1942 See driller's log.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Be 22	Bay Shore Industries, Inc.	Parkhurst	1942	23	Drilled	22	72	—	—
Be 23	Do	—	1942	24	do	37	72	—	—
Be 24	Do	Parkhurst	1942	26	do	22	—	—	—
Be 25	Aerial Products, Inc.	—	1932	35	do	200	6	—	—
Be 26	J. W. Fossett	G. Rinier	1949	155	do	85	6	75	—
Be 27	Do	—	Old	155	Dug	36	45	—	0
Be 28	Dr. George Schmidt	Ennis Brothers	1947	65	Drilled	91	6	—	5
Be 29	Thiokol Corporation	do	1942	65	do	75	6	74	—
Be 30	Do	do	1942	55	do	107	6	93	12
Be 31	Geigy Co., Inc.	do	1942	65	do	107	6	91	—
Be 32	Robert Loomis	Frank Hokus	1935	182	Dug	88	48–36	—	0
Be 33	Leeds Methodist Church	R. W. Slauch & Sons	1953	220	Drilled	67	$5\frac{5}{8}$	53.8	0
Be 34	Howard Jones	Fred McDougal	1949	220	do	100	6	58	—
Be 35	Elk Paper Mfg. Co.	Ennis Brothers	1950	110	do	30	6	22	—
Be 36	Fred Herron	Fred Herron	1950	70	Dug	13	40	—	0
Be 37	W. G. Brooks	W. W. Eiler	1949	170	Drilled	116	5	116	—
Be 38	Tony D. Lorenzo	Herbert Morgan	1948	65	do	294	6	—	—
Be 39	Louis Angeletti	Ennis Brothers	1949	50	do	125	6	115	5
Be 40	Adolf Nilson	Adolf Nilson	1944	170	Dug	26	24	—	0
Be 41	H. C. Thomas	—	1898	155	do	46	42	—	0
Be 42	William Reeves	William Reeves	1947	165	do	22	42	—	0
Be 43	R. L. Culver	G. Rinier	1949	120	Drilled	90	6	85	—
Be 44	Geigy Co., Inc.	Ennis Brothers	1942	70	do	92	6	81.5	—
Be 45	Thiokol Corporation	do	—	80	do	96	6	86.3	10
Be 46	Columbia Mfg. Co.	do	1947	70	do	210	—	—	—
Be 47	T. D. Shade	do	1952	40	do	39	4	32	5
Be 48	W. C. Racine	do	1944	110	do	129	—	—	—
Be 49	Harry Martin	do	1944	70	do	80	4	72.5	5
Be 50	J. H. Steele	R. W. Slauch & Sons	1946	60	do	125±	—	—	—
Be 51	J. Van Dyke	J. A. Douglass	1954	150	do	137	—	—	—
Be 52	Oblate Novitiate	—	1910	125	do	216	—	60	0

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Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Talbot	—	14.5[m]	2/22/43	T,E	—	—	—	N	48	See driller's log.
do	—	21.3[m]	2/22/43	T,E	—	—	—	N	48	Reported H 28, pH 7.4. Reported static level 6 ft. below land surface, summer, 1942. See driller's log.
do	—	19.42[m]	2/22/43	T,E	—	—	—	N	48	Reported static level 6 ft. below land surface, summer, 1942. See driller's log.
Potomac group	—	—	—	T,E	—	—	—	C	—	Estimated use: 20,000 gallons a day, 5 days a week.
Granodiorite	20	—	3/15/49	J,E	5	3/15/49	—	D,F	—	Water reported very irony. See driller's log.
Sunderland	20.42[m]	—	8/11/53	S,E	—	—	—	D	—	Frequently dry in summer; slightly irony.
Patapsco	50	78	11/—/47	J,E	40	11/—/47	1.4	D	—	
Potomac group	47.84[m]	—	8/11/53	NI	—	—	—	N	61	
do	—	—	—	J,E	—	—	—	C	—	Water reported milky.
do	55	—	1942	J,E	—	—	—	C	—	Screen used; length unknown.
Patapsco	82.66[m]	—	8/11/53	J,E	—	—	—	D	—	Dry in 1951.
Granodiorite	40	—	4/2/53	J,E	—	—	—	S	—	See driller's log.
do	30	80	t1/9/49	J,E	4	1t/9/49	<.1	D	—	
do	—	—	—	S,E	—	—	—	C	—	Water from creek for manufacturing paper. Well water used for drinking. See driller's log
Wicomico	9.99[m]	—	8/12/53	S,E	—	—	—	D	67	Bad taste at times.
Potomac group	85	90	1949	J,E	5	t949	t.0	D	—	See driller's log.
Granodiorite	150	170	12/10/48	J,E	50	12/10/48	2.5	C	—	Cabins and restaurant. Water falls below 190 foot intake in ½ hour pumping. See driller's log.
Patapsco	36	80	9/15/49	J,E	50	9/15/49	1.1	C	—	Restaurant. Water reported irony.
Patuxent	25.02[m]	—	9/9/53	C,E	—	—	—	D,F	—	Rock at 25 feet below land surface.
Patapsco	38.02[m]	—	9/9/53	J,E	—	—	—	D	—	
do	17	—	1950	J,E	—	—	—	D	—	
Potomac group	35	40	7/8/49	J,E	12	7/8/49	2.4	D	—	Supplies three families. See driller's log.
do	53	—	7/6/42	J,E	—	—	—	D	—	Screen used; length unknown.
do	—	—	—	J,E	—	—	—	D	—	Supplies three houses.
Granodiorite or Patuxent	—	—	—	J,E	—	—	—	N	—	See driller's and sample logs.
Patapsco	25	37	10/16/52	J,E	30	10/16/52	2.5	D	—	See driller's log.
Potomac group	—	—	—	N	—	—	—	N	—	Pumped sand.
Patapsco	58	—	11/28/44	C,H	30	—	.4	D,F	—	See driller's log.
—	—	—	—	J,E	—	—	—	C	—	Motel.
Potomac group	—	—	—	N	0	1954	—	N	—	No water; well drilled in sandy clay.
Granodiorite	—	—	—	—	—	—	—	S	55	Field test: Fe 7.0 ppm, H 170 ppm, pH 6.5. Casing probably bad. Pumps down in 1½ hrs at 6–9 gpm.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Be 53	Oblate Novitiate	—	1935	120	Drilled	90	—	30	0
Be 54	Ernest Davis	Ennis Brothers	1954	130	do	46	—	12	0
Be 55	A. P. Wheeler	—	—	220	Dug	19	36	—	—
Be 56	Olin Mathieson Corp.	Ennis Brothers	1955	65	Drilled	107	6	99	5
Bf 1	Pennsylvania R. R.	—	1907	125	do	71	6	—	—
Bf 2	Karl Kaleva	F. R. Dougherty	1951	130	do	60	6	31	0
Bf 3	Do	—	—	130	Dug	16	48	—	0
Bf 4	Harry H. Downham	F. H. Dougherty	1952	150	Drilled	48	6	33	0
Bf 5	Walter L. Gregg	do	1952	160	do	62	6	51	0
Bf 6	F. T. Williams, Jr.	do	1951	40	do	200	6	91	0
Bf 7	William Freng	do	1952	60	do	85	6	65	0
Bf 8	Wilbur E. Wright	R. W. Slauch & Sons	1951	65	do	109	$5\frac{5}{8}$	90	0
Bf 9	W. Benjamin	G. Rinier	1950	70	Dug & Drilled	42	6	42	—
Bf 10	Francis Rudy	do	1950	70	Drilled	43	6	40	—
Bf 11	T. Harrison	do	1951	60	do	48	6	34	5
Bf 12	Texaco Gas Station	Ennis Brothers	1952	35	do	60	4	65.5	6
Bf 13	Wm. Morony	F. R. Kielkopf	1952	75	do	43	6–4	—	5
Bf 14	Jerry Sutton	do	1953	65	do	39	6	33	5.5
Bf 15	Catholic Church	Ennis Brothers	1952	50	do	86	6	75.8	10
Bf 16	G. B. Campbell	—	1934	40	Dug	22	—	—	0
Bf 17	F. Powell	—	—	60	do	—	—	—	0
Bf 18	Raymond Reeder	—	1947	60	do	14	48	—	0
Bf 19	Vernon Miller	Ennis Brothers	1943	50	Drilled	75	4	—	—
Bf 20	J. M. Smith	do	1953	60	do	85	4	79.3	5
Bf 21	Joseph Ciampoli	—	—	90	Dug	47	48	—	0
Bf 22	W. Maloney	—	1900±	65	do	—	48	—	0
Bf 23	Nicholas Boinovych	—	—	55	do	30	48	—	0
Bf 24	H. B. Crowgey	—	—	80	do	18	—	—	0
Bf 25	Clyde Dean	—	—	40	do	18	48	—	0
Bf 26	Benjamin Love	—	—	120	do	25	—	—	0
Bf 27	R. T. Taylor	—	Old	150	do	34	48	—	0
Bf 28	Do	—	Old	154	do	38	48	—	0
Bf 29	Aksol Kolka	R. W. Slauch & Sons	1950	185	Drilled	100	6	—	0
Bf 30	W. R. Baldwin	—	—	90	Spring	—	—	—	—
Bf 31	Norman Simpers	—	1936	145	Dug	22	48	—	0
Bf 32	M. Gates	—	Before 1903	100	do	18	24	—	0
Bf 33	C. W. Feucht	Hess	1938	120	Drilled	160	6	90	0

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Water-bearing unit	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Granodiorite	—	—	—	—	—	—	—	S	—	Well at barn. Water pumped into 10,000 gal. tank.
do	—	—	—	—	—	—	—	D	57	Rock at 36 feet. See driller's log.
do	15.30	—	2/—/55	—	—	—	—	D,C	—	Field test: Fe 4.0 ppm, H 34 ppm, pH 6.3. Well at florist, 50 ft. from service station; water contaminated by gasoline.
Patapsco	47	103	5/2/55	T,E	60	5/2/55	1.1	C	—	See driller's log; pumping test.
Gabbro	8.36 m	—	9/28/49	C,H	—	—	—	N	59	Water reported slightly irony. Observation well.
do	6	22	12/1/51	S,E	16	12/1/51	1.0	D,F	—	Water reported irony. See driller's log.
Patapsco	6.66 m	—	9/9/52	S,E	—	—	—	D,F	—	
Granodiorite	12	20	4/21/52	S,E	15	4/21/52	1.9	D	—	See driller's log.
do	26	33	1/5/52	J,E	30	1/5/52	4.3	D	—	Do
do(?)	26	195	12/31/51	C,E	5	12/31/51	<.1	D	—	Water cloudy at times. See driller's log.
Gabbro(?)	26	78	4/16/52	—	5	4/16/52	<.1	D	—	
do	25	25	10/13/51	—	4	10/13/51	—	D	—	See driller's log.
Wicomico	23	—	12/27/50	J,E	—	—	—	D	—	Water discolored.
do	15	—	3/22/50	J,E	—	—	—	D	—	Water irony.
do	25	38	5/8/51	J,E	50	5/8/51	3.8	D	—	
do	27	53	6/11/52	J,E	30	6/11/52	1.2	C	—	See chemical analysis. Gas station.
do	23.5	25.5	11/10/52	J,E	40	11/10/52	20.0	C	—	Motel.
do	20	27	1/30/53	S,E	40	1/30/53	5.7	C	—	Motel.
Patapsco	53	85	4/2/52	T,E	85	4/2/52	2.7	P	—	See chemical analysis. Supplies seventeen houses in Holly Hall Terrace.
Wicomico	16	—	7/14/53	—	—	—	—	D	—	
do	—	—	—	—	—	—	—	D	—	
do	15.42 m	—	7/14/53	—,E	—	—	—	D	—	
do(?)	—	—	—	J,E	—	—	—	C	59	Gas station.
Patapsco	41.8	63	4/17/53	J,E	30	4/17/53	1.4	C	—	Ice cream stand. See driller's log.
Wicomico	—	—	—	J,E	—	—	—	C,D,F	—	Motel.
do	18	—	—	J,E	—	—	—	D,F	—	
do	26	—	—	J,E	—	—	—	D	—	Went dry in 1930; deepened.
do	—	—	—	—	—	—	—	D	—	Another well at barn, 20 ft. deep.
do	13.82 m	—	7/15/53	S,H	—	—	—	D	—	
Patuxent	—	—	—	S,E	—	—	—	D,F	—	Water reported slightly irony
do	24.67 m	—	7/28/53	J,E	—	—	—	D,F	—	
do	—	—	—	N	—	—	—	N	—	
Potomac group	48	—	1950	J,E	—	—	—	D	—	Water reported fair, irony.
Granodiorite	—	—	—	N	—	—	—	D	—	Never dry, but no noticeable flow. Supplies four houses.
do	19.74 m	—	7/28/53	J,E	—	—	—	D	—	
do	10	—	7/28/53	B,H	—	—	—	D	—	Unfit for drinking.
do	—	—	—	S,E	—	—	—	D,F	—	Water reported irony.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bf 34	Charles Spry	Charles Spry	1952	80	Dug	21	42	—	0
Bf 35	Do	Hess and Brown	1938	60	Dug & Drilled	90	6	—	0
Bf 36	R. M. Roberts	—	—	90	Dug	15	36	—	0
Bf 37	Waldo Lovett	—	—	130	do	25	60	—	0
Bf 38	Do	—	—	130	do	25	60	—	0
Bf 39	Nelson Walstrum	Nelson Walstrum	1941	160	do	92	48	—	0
Bf 40	Einar Jokinen	—	Old	160	do	40	42	—	0
Bf 41	So. States Elkton Petroleum Coop., Inc.	Ennis Brothers	1953	60	Drilled	124	4	—	5
Bf 42	Mrs. Henry Lewis	—	—	60	do	96	4	—	5
Bf 43	Wallace Bowe	L. W. Slauch & Sons	1953	180	do	98	5⅝	79.1	0
Bf 44	T. F. Crawford	L. J. Walton	1953	120	do	99	6	46	0
Bf 45	Do	do	1953	120	do	108	6	52	0
Bf 46	A. L. Gursha	Ennis Brothers	1949	40	do	215	6	120	0
Bf 47	W. W. Keithley	do	1953	60	do	78	4	—	5
Bf 48	J. J. Curry	—	1951	65	Dug	18	36	—	0
Bf 49	Catholic Church	Ennis Brothers	—	65	Drilled	193	6	—	—
Bf 50	Do	do	—	30	do	61	6	50.5	10
Bf 51	Do	do	1946	50	do	164	6	104	—
Bf 52	Do	do	1946	20	do	50	4	42	5
Bf 53	Do	do	1952	50	do	91	5½	82	10
Bf 54	Grany Diner	do	1953	40	do	74	6	67	5
Bf 55	E. H. Bollenbacker	do	1946	65	do	47	6	—	6
Bf 56	Holly Hall Utilities Corp.	do	1954	45	do	75	6	59	15
Cc 1	S. Lord	G. Rinier	1951	120	do	65	6	60	0
Cc 2	F. R. Sentman	H. A. Thomas	1952	140	do	30	6	28	0
Cc 3	F. A. Bell	H. Morgan	1950	120	do	70	6	31	0
Cc 4	Elinor Whitaker	H. & H. Drilling Co.	1952	130	do	33	6	21	0
Cc 5	P. N. Craig	do	1952	145	do	35	6	16	0
Cc 6	Leslie Roberts	G. Rinier	1950	220	do	43	6	30	0
Cc 7	Coite Hinshaw	R. Hoffman (S. D. Smith)	1951	220	do	53	6	27	0
Cc 8	R. McMullen, Jr.	F. H. Dougherty	1952	120	do	135	6	114	0
Cc 9	C. B. Sturgill	G. Rinier	1950	125	do	130	6	80	0
Cc 10	Wm. E. Jones	H. Morgan	1950	140	do	162	6	80.5	0
Cc 11	Flora Zeigler	G. Rinier	1948	140	do	93	6	65	0
Cc 12	J. N. Vaughn	Ennis Brothers	1950	25	do	124	4	117	5
Cc 13	W. Buck	G. Rinier	1951	12	do	56	6	50	5
Cc 14	Wm. Shivery	Ennis Brothers	1950	35	do	121	4	116	5
Cc 15	S. H. Bailey	F. H. Dougherty	1952	70	do	116	6	112	4

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Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Wicomico	11	—	7/1/53	S,E	—	—	—	D	—	
Serpentine	—	—	—	S,E	—	—	—	D,F	—	
Wicomico	—	—	—	S,E	—	—	—	D	—	
Patuxent	15	—	1945	J,E	—	—	—	D	—	Water reported slightly irony.
do	—	—	—	S,E	—	—	—	C	—	Airport.
Gabbro	—	—	—	N	—	—	—	N	—	Little water; abandoned.
do	27.42 [m]	—	7/29/53	J,E	—	—	—	D,F	—	
Patuxent	42.69 [m]	—	8/5 53	J,E	—	—	—	C	56	Gas distributor. See driller's log
Potomac group	—	—	—	—	25	—	—	D	—	
Granodiorite	44	60	4/2/53	J,E	4.5	4/2/53	.3	D	—	See driller's log.
Gabbro	15	60	3/11/53	—,E	3	3/11/53	<.1	D	—	Do
do	14	55	3/18/53	—,E	3	3/18/53	<.1	D	—	Do
Serpentine(?)	20	100	3/3/49	T,E	14	3/3/49	.2	D	—	Water reported poor, very irony Filter. See driller's log.
Potomac group	—	—	—	—	40	—	—	D	—	See driller's log.
Patapsco	10	—	9/25/53	S,H	—	—	—	D	—	
Gabbro(?)	—	100	—	—	30	—	—	P	—	Holly Hall Terrace.
Patapsco	26	40	1946	J,E	60	1946	4.3	F	—	Do
Gabbro(?)	38	—	1946	J,E	6	1946	—	D	—	Holly Hall Terrace. See driller's log.
Patapsco	23	39	7/30/46	—	40	1946	2.5	D	—	
do	49	80	1952	NI	120	1952	3.9	P	—	Holly Hall Terrace standby well. Static level 47.41 ft. below land surface, 11/18/53. See driller's log.
do	40	60	7/27/53	J,E	50	7/27/53	2.5	C	—	
do	29.5	42	8/6/46	J,E	50	8/6/46	4.0	D	—	
do	31	46	9/24/54	—	120	1954	8.0	N	—	Observation well in pumping test. See driller's log and temperature log.
Granodiorite	30	—	11/3/51	—	—	—	—	D	—	See driller's log.
do	18	24	1/29/52	—,E	10	1/29/52	1.7	D	—	Do
do	68	70	5/28/50	—,E	2	5/28/50	1.0	D	—	
do	24	—	1/2/52	J,E	—	—	—	D	—	Water reported slightly hard.
do	16	30	1/10/52	—,E	3	1/10/52	.2	D	—	
do	10	—	11/6/50	J,E	—	—	—	D	—	
do	16	41	10/8/51	J,E	8	10/8/51	.3	D	—	Water reported slightly hard.
do(?)	60	80	5/28/52	N	15	5/28/52	.8	N	—	See driller's log.
do	40	—	6/6/50	J,E	—	—	—	D	—	
do	158	160	5/6/50	N	1.5	5/6/50	.8	N	—	Water reported slightly hard. See driller's log.
do	—	—	—	J,E	—	—	—	D	—	Supplies four families. See driller's log.
Patuxent	47.8	60	6/22/50	J,E	20	6/22/50	1.6	D	—	Water reported hard, slightly irony. See driller's log.
Potomac group	3	—	11/23/51	—	—	—	—	D	—	See driller's log.
do	—	—	—	J,E	35	8/5/50	—	D	—	Water reported irony. See driller's log.
Patuxent	65	90	4/4/52	J,E	12	4/4/52	.5	D	59	Field test: Fe 0.9 ppm, H 17 ppm, pH 7. See driller's log.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Cc 16	W. R. Taylor	S. H. Bailey	1953	85	Drilled	30	6	18	0
Cc 17	Sam Heffner	do	1953	12	do	28	6	15	0
Cc 18	Russell T. Clayton	W. H. Eiler	1948	145	do	53	4	—	0
Cc 19	D. J. Cannon	F. H. Dougherty	1953	200	do	39	6	21	0
Cc 20	Woodlands Farm	—	Before 1923	65	Dug	30	60	—	0
Cc 21	Do	—	1932	135	Drilled	100+	6	—	0
Cc 22	Whitaker Iron Co.	—	Old	100	Dug	30	42	—	0
Cc 23	J. B. Van Cicle	W. H. Eiler	1950	130	Drilled	117	6	—	0
Cc 24	J. Hale Steinman	Ennis Brothers	1953	5	do	70	4	65	—
Cc 25	Charles Osborne	—	—	80	do	158	—	—	—
Cc 26	Ana Tidae, Inc.	Harr Brothers	—	60	do	135	6	—	—
Cc 27	Do	do	—	65	do	110	6	—	—
Cc 28	Fred Sullivan	Ennis Brothers	1945	50	do	78	4	—	5
Cc 29	H. J. Lipham	—	—	40	Spring	—	—	—	—
Cc 30	H. Muller-Thyme	—	—	40	do	—	—	—	—
Cc 31	Do	—	—	20	do	—	—	—	—
Cc 32	Kirk Brown	—	1948	60	Drilled	136	—	—	—
Cc 33	H. J. Lipham	Jones Douglass	1954	40	do	67	6	65	—
Cc 34	Mason and Dixon Sand and Gravel Co.	S. D. Smith	1953	185	do	137	6	—	—
Cc 35	Fred Sullivan	—	—	50	Dug	28	36–6	—	—
Cc 36	Do	Jones Douglass	1954	50	Drilled	76	6	76	—
Cc 37	St. Marks Church	L. T. Walton	1952	240	do	100	6	25	—
Cd 1	Charlestown school	R. W. Slauch & Sons	1952	35	do	88	6	—	—
Cd 2	M. W. Simpers	do	1951	25	do	64	6	60	—
Cd 3	Morning Cheer, Inc.	Ennis Brothers	1951	25	do	68	6	63	5
Cd 4	R. Jester	J. N. Unruh	1950	40	do	92	4	84	8
Cd 5	Morning Cheer, Inc.	Ennis Brothers	1951	60	do	—	—	—	—
Cd 6	Do	do	1951	25	do	—	—	—	—
Cd 7	J. A. Sten	do	1952	65	do	132	4	127	5
Cd 8	J. Herman Steele	do	1951	10	do	59	4	54	5
Cd 9	Wm. Glanding	F. B. Rogers	1946	25	do	174	6	167	—
Cd 10	W. E. Fogg	Ennis Brothers	1951	80	do	83	4	78	5
Cd 11	Eero Leminen	do	1951	65	do	86	4	81	5

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Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Granodiorite	3.5	10	6/9/53	J,E	30	6/9/53	4.6	D	—	See driller's log.
do	3	24	1/30/53	J,E	10	1/30/53	.5	D	—	Do
do	18	36	11/15/48	J,E	200/day	11/15/48	—	C	—	Yield (1953): 40 g/p/d; supply inadequate. Store.
Metadacite	12	32	3/28/53	J,E	5	3/28/53	.3	D	—	See driller's log.
Wicomico	18	—	9/—/53	S,E	—	—	—	D,F	—	Water reported slightly hard
—	—	—	—	C,H	—	—	—	D	—	Rock at 00 feet.
Wicomico	—	—	—	S,E	—	—	—	D	—	Water reported slightly hard. Never dry.
Granodiorite	80	110	1950	J,E	3	1950	.1	D	—	See driller's log.
Patuxent	4.5	—	2/25/53	T,E	—	—	—	D	—	Water reported slightly irony.
do	—	—	—	J,E	—	—	—	D	—	
do	20	—	—	J,E	—	—	—	D	—	
do	25	—	—	J,E	—	—	—	D	55	Field test: Fe 0.2 ppm, H 35–50 ppm, pH 7.3. Screen used; length unknown.
do	38	76	10/10/45	—	8.5	10/10/45	.2	N	—	Water unfit for use. See driller's log.
Wicomico	—	—	—	—,E	—	—	—	P	—	Supply for Carpenters Point. Pumped to reservoir. See chemical analysis.
do	—	—	—	N	Small	2/25/54	—	N	—	Used for sprinkling golf course greens.
do	—	—	—	—,E	2	2/25/54	—	D	—	Supplies two houses.
Patapsco	—	—	—	—	—	—	—	D	55	Drilled in bottom of 50-foot dug well. Field test: Fe 0.5 ppm, H 17 ppm, pH 7.0.
do	12	30	8/5/54	—	20	8/5/54	1.1	P	—	To supplement spring Fe 0.5 ppm, H 22 ppm, pH 5.4. See chemical analyses.
Patuxent	118	134	8/—/53	J,E	10	8/—/53	.6	C	—	See chemical analysis.
Wicomico	25.88 m	—	4/15/55	J,E	—	—	—	D	—	4 ft. of 6-in. pipe at bottom of well.
Patuxent	35	40	5/20/54	N	6	5/20/54	1.2	N	—	
Metadacite	25	95	10/28/52	N	.5	10/28/52	<.1	N	—	At rectory. See driller's log.
Patuxent	14	80	7/17/52	NI	14	7/17/52	.2	S	—	See driller's log.
Patapsco	22	40	3/10/51	—	30	3/10/51	1.7	D	57	Casing slotted. See driller's log.
do	34.8	—	2/6/51	T,E	—	—	—	D	—	Water fair, irony. Screen clogs. Summer camp. See driller's log.
do	38	60	9/—/50	—,H	15	9/—/50	.7	D	—	Water poor, very irony.
do	—	—	—	J,E	—	—	—	D	—	Summer camp.
do	—	—	—	T,E	—	—	—	D	—	Do
do	65	98	3/31/52	J,E	20	3/31/52	.6	D	55	See driller's log.
do	24	—	12/28/51	J,E	—	—	—	D	—	Do
do	41	65	5/21/46	—	3	5/21/46	.1	D	—	Water reported irony. Gravel packed. See driller's log.
do	60	82	11/12/51	J,E	41	11/12/51	1.9	D	—	Water reported poor, acid. See driller's log.
do	34	62	12/—/51	C,E	20	12/—/51	.7	D,F	55	See driller's log.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Cd 12	Do	W. H. Eiler	1949	63	Drilled	245	—	—	0
Cd 13	Ernest Wood	Ennis Brothers	1946	200	do	350	6–4	97	10
Cd 14	McDaniel Yacht Basin	F. B. Rogers	1946	40	do	79	5⅝	79	—
Cd 15	Delmarva Council Inc.	—	1930	10	do	178	8	—	—
Cd 16	P. J. Garretson	Ennis Brothers	1942	200	do	325	—	—	—
Cd 17	Mrs. T. W. Trainer	—	—	2	Dug	12	48	—	—
Cd 18	Otis McCauley	C. J. Shaffer	1949	20	Drilled	49	2½	42	0
Cd 19	Andrew Speer	Ennis Brothers	1953	25	do	108	4	102	5
Cd 20	John A. Springer	do	1953	60	do	140	4	135	5
Cd 21	Wm. Dilks	—	—	15	Driven	12	1½	—	—
Cd 22	Allen Jeffrey	—	—	130	Spring	—	—	—	—
Cd 23	Edwin T. McDowell	—	—	140	Dug	25	48	—	—
Cd 24	Comado Dickens	Comado Dickens	1951	80	Driven	26	1¼	—	—
Cd 25	P. Sergeiko	—	1947	180	Drilled	135	—	—	—
Cd 26	Elkton Sparkler Inc.	Ennis Brothers	1953	20	do	41	4	36	5
Cd 27	Bay Boat Work, Inc.	R. W. Slauch & Sons	1953	10	do	320	6	—	—
Cd 28	Gordon Melrath	do	1953	5	do	84	6	—	—
Cd 29	Paul Collins	—	—	85	Dug	11	36	—	0
Cd 30	Charlestown Fire Dept.	—	1948	20	Driven	22	—	—	—
Cd 31	Board of Education	R. W. Slauch & Sons	1953	20	Drilled	92	6	—	—
Cd 32	S. Tomargo	W. H. Eiler	1950	35	do	117	6	—	—
Cd 33	Pericat-Scrivanich	C. J. Shaffer	1949	10	do	176	—	—	—
Cd 34	J. Miller	—	—	20	Driven	40	—	—	—
Cd 35	Delmarva Council, B.S.A.	Ennis Brothers	1955	100	Drilled	180	8	136	15
Ce 1	John H. Irwin	L. T. Walton	1952	75	do	23	8	25	6
Ce 2	Do	do	1952	75	do	120	8	26.5	—
Ce 3	George Miller	J. N. Unruh	1950	20	do	135	4	127	8
Ce 4	Martin Tothero	do	1950	60	do	117	4–3	112	5
Ce 5	Dr. H. V. Davis	Ennis Brothers	1952	25	do	50	4	45.5	5
Ce 6	C. Breda	Breda	1923	45	Dug	12	40(?)	—	0
Ce 7	M. Basalygo	M. Basalygo	1933	50	do	55	48	55	0
Ce 8	Joseph Piri	—	1943	30	do	16	48	—	0

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Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Patuxent	60	85	1/24/49	N	20	1/24/49	.8	N	—	Abandoned; pumped sand. See driller's log.
Patapsco	193	250	10/11/46	J,E	40	10/11/46	.7	D	—	Water reported slightly irony. See driller's log.
Potomac group	35	—	5/27/46	J,E	20	5/27/46	—	D	—	Casing perforated. Water reported irony, hard. Filter.
Patapsco	—	—	—	T,E	—	—	—	D	—	Scout camp. Water reported irony. Gravel packed.
do	—	—	—	—,E	—	—	—	D,F	—	Water reported very irony.
Potomac group	—	—	—	S,E	—	—	—	D	—	Water reported hard and irony. Filter.
Patapsco	8	19	4/—/49	S,E	12	4/—/49	1.1	D	—	
do	22	84	7/31/53	—	60	7/31/53	1.0	D	—	See driller's log.
do	60	80	7/7/53	—	25	7/7/53	1.2	D	—	Do
do	—	—	—	S,E	—	—	—	D	—	
do	—	—	—	—	—	—	—	D	—	Supplies three houses.
do	23.53[m]	—	12/8/53	S,H	—	—	—	D	—	Went dry in fall, 1953.
Wicomico	18	—	12/8/53	S,E	—	—	—	D,F	—	
Patapsco	—	—	—	—,E	—	—	—	N	—	Well abandoned; spring used.
do	15	—	—	S,E	—	—	—	C	—	
do	—	—	—	N	—	—	—	N	—	Supply inadequate.
do	1	3	5/1/53	S,E	25	5/1/53	12.5	D	—	Casing perforated 12 feet from bottom. Water reported hard, irony. See driller's log.
Wicomico	7	—	12/10/53	—,E	—	—	—	D,F	—	Water low in summer, 1953.
Patapsco	17	—	—	J,E	—	—	—	P,S	—	Supplies fire house and school. Water slightly irony.
Patuxent	—	—	—	J,E	—	—	—	S	—	Water reported very irony and hard.
do	45	52	1950	J,E	5	1950	.7	D	—	Water hard, irony, odorous. Filter. See driller's log.
do	—	—	—	—	—	—	—	—	—	
Patapsco	—	—	—	—	—	—	—	C	55	Store and gas station. Field test: Fe 0.5 ppm, H 17 ppm, pH 6.5.
Patuxent	97	116	11/22/55	J,E	—	—	—	D	—	Boy Scout Camp. See driller's log.
	85.35[m]	95.57[m]	9/14/56		90	9/14/56	8.8			
Patapsco	10	20	7/29/52	N	4	7/29/52	.4	N	—	Using dug well. Slotted pipe. See driller's log. Static level 14.70 ft. below land surface, 10/28/52.
Potomac group	5	19	7/25/52	S,E	4	7/25/52	.3	N	—	Slotted pipe. See driller's log.
Patapsco	35	90	7/—/50	—	6	7/—/50	.1	D	—	Water reported very irony. See driller's log.
do	17	60	6/—/50	—	20	6/—/50	.5	D	—	See driller's log.
do(?)	15	48	9/23/52	NI	20	9/23/52	.6	D	—	Do
Wicomico	—	—	—	S,E	—	—	—	D	—	Low at times.
do	47	—	1947	J,E	—	—	—	D	—	Chloride reported 52-80 ppm. Went dry when canal was deepened; dug deeper.
do	—	—	—	J,E	—	—	—	D	—	Water reported hard. Dry in fall.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ce 9	P. S. Howard	—	—	70	Dug	18	36	—	0
Ce 10	Strecker	Ennis Brothers	1952	18	Drilled	43	4	33	5
Ce 11	George Jewell	—	—	60	Dug	30	48	—	0
Ce 12	Arundel Corporation	—	—	20	do	26	—	—	—
Ce 13	Pete Dudkewitz	—	—	5	Driven	12	2	—	—
Ce 14	L. F. Kuszmaul	—	Old	10	Drilled	115	—	—	—
Ce 15	H. Levering	Ennis Brothers	—	40	do	192	—	—	—
Ce 16	Do	—	—	40	Dug	21	—	—	—
Ce 17	Dr. M. B. Holzman	—	—	10	do	12	48	—	—
Ce 18	Ed. Taylor	—	1952	5	Driven	12	1¼	—	—
Ce 19	Harry Ott	—	—	5	Dug	10	—	—	—
Ce 20	Thomas E. Bishel, Sr.	—	—	5	Driven	30	1½	—	—
Ce 21	C. Kirschbaum	—	—	10	Dug	19	48	—	—
Ce 22	Gene Wood	J. N. Unruh	1952	15	Drilled	201	4	196	5
Ce 23	H. V. Berg	—	—	65	Dug and driven	110	—	—	—
Ce 24	Leonard M. Little	J. N. Unruh	—	60	Drilled	295	—	—	—
Ce 25	Wm. Walters	—	—	60	Dug	16	—	—	—
Ce 26	Howard R. Bostwick, Sr.	Ennis Brothers	1947	10	Drilled	63	4	—	5
Ce 27	Samuel Massey	—	—	60	Dug	27	—	—	—
Ce 28	A. Littlewood	Ennis Brothers	Before 1943	65	Drilled	144	—	—	—
Ce 29	Do	do	do	15	do	245	—	—	—
Ce 30	A. T. Schriber	—	—	10	Driven	8	1¼	—	—
Ce 31	T. Firth	—	—	15	Dug	12	—	—	—
Ce 32	L. D. Norman	—	—	60	do	20	—	—	—
Ce 33	S. M. Nickerson, Jr.	—	—	50	do	17	—	—	—
Ce 34	W. J. White	Ennis Brothers	1952	40	Drilled	73	—	—	—
Ce 35	L. C. Eckles	J. N. Unruh	—	30	do	131	—	—	—
Ce 36	W. G. Slaughter	do	Before 1948	60	do	142	—	—	—
Ce 37	Alfred Jervis	do	—	25	do	238	—	—	—
Ce 38	Dr. Hector	do	—	25	do	242	—	—	—
Ce 39	E. H. Powell	do	—	30	do	79	—	—	—
Ce 40	Dr. H. V. Davis	Ennis Brothers	1950	20	do	54	4	46.5	5
Ce 41	Clements	do	1940	15	do	100	—	—	—
Ce 42	E. Henderson	Middletown Well Drlg. Co.	1953	180	do	264	6	—	5
Ce 43	W. W. Mellen	Ennis Brothers	1945	20	do	202	6	191	5
Ce 44	D. M. Henderson	—	—	20	Spring	—	—	—	—
Ce 45	Do	—	—	120	Dug	70	—	—	—
Ce 46	Wm. P. Racine	—	—	90	Driven	41	1½	—	—
Ce 47	Arundel Corporation	—	—	50	Dug	—	—	—	—
Ce 48	Peter Martinuk	—	1942–46	75	Drilled	80–100	6	—	0

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Water-bearing unit	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Wicomico	—	—	—	S,E	—	—	—	D,F	—	Water reported hard.
Patapsco	15	38	9/22/52	NI	40	9/22/52	1.7	D	—	
Wicomico	32	—	2/18/53	S,E	—	—	—	D	—	Went dry, 1948.
Talbot	23	—	7/14/53	S,H	—	—	—	D	—	Water reported very irony.
Patapsco	—	—	—	—,E	—	—	—	D	—	Do
do	—	—	—	T,E	—	—	—	D	—	Water reported very irony. Filter.
Potomac group	—	—	—	J,E	—	—	—	D	—	Do
Wicomico	9.50 m	—	7/17/53	S,H	—	—	—	D,F	—	Four dug wells; three have irony water.
Talbot	7.68 m	—	7/16/53	—,E	—	—	—	D	—	Water very irony. Filter.
do	—	—	—	S,H	—	—	—	D	—	Water irony.
do	6.4 m	—	7/16/53	J,E	—	—	—	D	—	
do	—	—	—	S,E	—	—	—	D	—	Water slightly irony.
do	5.8 m	—	7/17/53	—,E	—	—	—	D	—	Water reported irony. Supplies three cottages.
Potomac group	6	85	6/30/52	T,E	30	6/30/52	.4	D	—	Water irony. H_2S. Supplies two houses. Filter. Static level 4.40 ft. below land surface, 7/17/53. See driller's log.
Wicomico	—	—	—	S;E, W	—	—	—	D,F	—	
Potomac group	—	—	—	—,E	—	—	—	D	—	Filter. See driller's log.
Wicomico	—	—	—	S,H	—	—	—	D	—	
Patapsco	4.5	50	5/16/47	C,E	50	5/16/47	1.1	D	—	See driller's log.
Wicomico	8	—	—	—,E	—	—	—	D,F	—	
Potomac group	—	—	—	—	—	—	—	D,F	—	
Patapsco	—	—	—	—	—	—	—	D	—	Do
Talbot	—	—	—	J,E	—	—	—	C,D	—	Boat yard.
do	—	—	—	—,E	—	—	—	D	—	Water reported a little irony.
Wicomico	—	—	—	—,E	—	—	—	—	—	Water reported irony.
do	—	—	—	C,E S,H	—	—	—	D,F	—	
Patapsco	—	—	—	T,E	—	—	—	D	—	Water reported very irony. See driller's log.
do	—	—	—	—	—	—	—	D	—	See driller's log.
do	—	—	—	J,E	—	—	—	D	—	Water reported very irony, H_2S. Filter. See driller's log.
do	—	—	—	—	—	—	—	D	—	See driller's log.
do	—	—	—	—	—	—	—	D	—	Do
do	—	—	—	S,E	—	—	—	D	—	Water irony. Filter.
do	16.9	40	4/27/50	S,E	40	4/27/50	1.7	D	—	See driller's log.
do	—	—	—	—,E	—	—	—	D	—	Water reported very irony.
do	—	—	—	—	—	—	—	D	—	See driller's log.
do	27	40	9/25/45	—	25	9/25/45	1.9	D	—	Do
Talbot	—	—	—	S,E	10–15	12/9/53	—	D,F	—	Steady flow.
Sunderland	—	—	—	C,W	—	—	—	D,F	—	
Wicomico	—	—	—	J,E	—	—	—	D	—	
do	—	—	—	J,E	—	—	—	D	—	
Patapsco	—	—	—	J,E	—	—	—	D,F	—	Water reported slightly irony.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ce 49	P. Martinuk	—	—	80	Drilled	100	4	—	—
Ce 50	J. Perovich	—	—	260	Dug	43	36	—	0
Cf 1	State Roads Commission	Coop. Ground-Water Staff	1956	10	Driven	10	1¼	10	—
Cf 2	Chesapeake City	J. B. Rulon	1937	30	Drilled	285	10–6	270	15
Cf 3	U. S. Army Engineers	U. S. Army Engineers	1935	8	Driven	100	4	—	—
Cf 4	Do	do	1923	20	Drilled	780	8	—	0
Cf 5	Losten's Dairy	J. N. Unruh	1952	45	do	150	8	124	26
Cf 6	H. Van Den Heubel	H. Van Den Heubel	1952	20	Dug	34	48	—	0
Cf 7	L. Price	—	—	30	do	16	30	—	0
Cf 8	W. Williams	—	—	50	do	15	48	—	0
Cf 9	Harvey K. Miller Lumber Co.	Ennis Brothers	1947	25	Drilled	276	4	—	—
Cf 10	Do	do	1943	25	do	51	6	—	0
Cf 11	F. R. Speed	J. Sevin	1949	20	Driven	22	1¼	—	—
Cf 12	Charles R. Wharton	—	1940	55	Drilled	100	6	—	0
Cf 13	St. Basils Orphanage	Arktini	1916	65	do	200	3	—	—
Cf 14	Marine Construction Co.	—	1913(?)	15±	Dug	18	48	—	0
Cf 15	Gus Barker	Gus Barker	1945	42	do	16	42	—	0
Cf 16	C. R. Wharton	Ennis Brothers	1945	40	Drilled	147	4	—	—
Cf 17	Morris Kane, Sr.	do	1944	60	do	202	4	193	10.8
Cf 18	David McNatt	M. A. Pentz	1947	70	do	190	4(?)	—	—
Cf 19	William Brady	Ennis Brothers	1941	40	do	242	4	—	—
Cf 20	H. Prutzman	do	1952	60	do	145	4	—	—
Cf 21	E. Lee Ott	—	—	40	Dug	33	—	—	0
Cf 22	Joseph Emerle	—	—	75	do	18	48	—	0
Cf 23	Frank Hutton	—	—	80	do	20	48	—	0
Cf 24	Ridgely Constable	—	—	60	do	19	36	—	0
Cf 25	David Renshaw	—	—	60	do	7	36	—	0
Cf 26	Wallace William, Jr.	—	—	60	do	14	48	—	0
Cf 27	Do	—	—	78	do	24	—	—	0
Cf 28	Do	Ennis Brothers	1943	78	Drilled	363	—	—	—
Cf 29	J. Schneider	—	1952	60	Dug	10	36	—	0

—Continued

Water bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Patapsco	—	—	—	J,E	—	—	—	D,F	—	Water reported slightly irony, hard.
Raritan	40.42[m]	—	12/8/53	J,E	—	—	—	F	—	
Talbot	2.82[m]	—	3/2/56	N	—	—	—	N	—	Observation well.
Patapsco	80	—	1937	T,E	95	—	—	P	—	Water very irony. See chemical analyses.
do	5.12[m]	—	2/17/53	N	—	—	—	N	—	Abandoned because of very high iron content: 20 ppm. Screen used; length unknown.
Potomac group	—	—	—	N	—	—	—	N	—	Reported to flow from 500 ft. Water reported irony. Well destroyed.
Raritan	30	72	9/13/52	NI	300	9/13/52	7.1	F	—	Static level 28.45 ft. below land surface, 2/16/53. See driller's and sample logs.
Magothy	30.57[m]	—	2/17/53	NI	—	—	—	D	—	
do	6.13[m]	—	2/17/53	S,E	—	—	—	D	—	
Wicomico	1	—	2/17/53	S,E	—	—	—	D	—	
Patapsco	18	90	7/21/47	J,E	20	7/21/47	.3	D,C	—	Sawmill and domestic. Poor water; acid, irony. Filter. Screen used; length unknown. See driller's log.
Raritan	12	—	1947	N	—	—	—	N	—	Abandoned. Water very poor, irony.
do	10	—	2/17/53	S,E	—	—	—	D	—	Water irony.
Patapsco	33.83[m]	—	2/17/53	J,E	—	—	—	C,D	—	Water irony. Chloride 32 ppm.
do	—	—	—	C,E	—	—	—	S	—	Water reported irony. Chloride 44 ppm.
Raritan	8	—	2/17/53	S,H	—	—	—	C	—	Boat yard. Water reported slightly irony.
Wicomico	6	—	2/18/53	J,E	—	—	—	D	—	Low at times.
Raritan	—	—	—	J,E	—	—	—	D	—	Reported irony, swampy odor. Screen used; length unknown. See driller's log.
do	35	—	9/—/44	J,E	—	—	—	D	—	Reported irony. Filter. See driller's log.
do	—	—	—	J,E	—	—	—	D	—	Reported very irony. Chloride 40 ppm. Screen used; length unknown. See chemical analysis.
Patapsco	—	—	—	S,E	15	12/17/41	.3	D,F	—	See driller's log.
do	50	—	1952	J,E	35	—	—	D	—	Reported irony. See driller's log.
Wicomico	—	—	—	—,E	—	—	—	D	—	
do	12.31[m]	—	7/15/53	J,E	—	—	—	D	—	
do	12	—	7/15/53	S,E	—	—	—	D,F	—	
do	9.39[m]	—	7/15/53	S,E	—	—	—	D	—	
do	1.88[m]	—	7/15/53	—,E	—	—	—	F	—	
do	5.75[m]	—	7/15/53	—,E	—	—	—	D,F	—	
do	12.07[m]	—	7/15/53	—,E	—	—	—	F	—	Went dry in 1948.
Patapsco	—	—	—	—	—	—	—	D,F	56	See driller's log.
Wicomico	7.25[m]	—	7/16/53	J,E	—	—	—	D	—	Gets low.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Cf 30	Frank Blanton	Frank Blanton	—	60	Drilled	32(?)	4(?)	—	—
Cf 31	Mrs. B. F. Ross	Ennis Brothers	1945±	70	do	241	5	—	—
Cf 32	Fehlhaber Pile Co.	do	1946	15	do	108	6	—	12
Cf 33	H. Marion Rosin	do	1948	15	do	149	4	—	5
Cf 34	H. K. Miller Lumber Co.	do	1947	10	do	276	4	—	—
Cf 35	Wallace Williams	—	—	70	Dug	12	—	—	0
Cf 36	Do	—	—	40	do	29	48	—	0
Cf 37	Helen Shwykia	—	—	30	do	12	—	—	0
Cf 38	Leroy Ford	—	—	60	do	55	8	—	0
Cf 39	George Stubbs	—	—	71	do	14	48	—	0
Cf 40	Edward Stubbs, Sr.	—	—	71	do	26	—	—	0
Cf 41	S. D. Caldwell	—	—	60	do	25	—	—	0
Cf 42	Renappi Corporation (Du Pont)	—	—	60	do	27	—	—	0
Cf 43	Do	—	—	25	do	25–30	—	—	0
Cf 44	Titter Brothers	—	—	60	do	20	—	—	0
Cf 45	Albert Bank	—	—	60	do	29	—	—	0
Cf 46	Harvey K. Miller, Jr.	Ennis Brothers	1953	80	Drilled	177	6	165	10
Dc 1	Salvatorian Mission Home	F. H. Dougherty	1951	5	do	246	4	—	5
Dd 1	Morning Cheer, Inc.	Ennis Brothers	1951	50	do	250	5½	—	5
Dd 2	Dept. of Forests & Parks	Layne-Atlantic	1950	140	do	232	4	217	10
Dd 3	H. G. D. Carr	Ennis Brothers	1951	15	do	228	4	219	5
Dd 4	E. H. Shuman	do	1950	25	do	42	4	34.5	5
Dd 5	H. H. Parcher	do	1950	30	do	73	4	66.5	5
Dd 6	I. J. Krchma	do	1951	25	do	84	—	—	5
Dd 7	D. Fletcher	J. N. Unruh	1950	25	do	79	4	75	4
Dd 8	Bollinger	do	1951	55	do	93	4	89	4
Dd 9	Dunbar	F. R. Kielkopf	1952	55	do	94	4	90	4
Dd 10	Wm. Shultz	J. N. Unruh	1950	30	do	102	4–3	98	4
Dd 11	Wm. Weaver	do	1950	60	do	106	4–3	102	4
Dd 12	Wm. Shultz	do	1950	70	do	114	4–3	110	4
Dd 13	John Gordon	Ennis Brothers	1950	70	do	148	4	142	5
Dd 14	Charles V. Cleaver	do	1950	45	do	70	4	65.8	5
Dd 15	George Cannon	do	1951	60	do	150	4	144.5	5
Dd 16	C. J. McKay	do	1951	60	do	89	4	83.5	5
Dd 17	C. W. Cole	do	1952	40	do	76	4	66	5

—Continued

Water-bearing unit	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
—	—	—	—	—,E	—	—	—	D	—	Never dry.
Patapsco	—	—	—	—,E	—	—	—	F	55	See driller's log.
Raritan	12	60	8/7/46	N	80	8/7/46	1.7	N	—	Abandoned after construction of Canal bridge. See driller's and sample logs.
Patapsco	8	80	4/—/48	N	60	4/—/48	.8	N	—	At old movie theater. See driller's log.
do	18	90	7/21/47	—	20	7/21/47	.3	D	—	See driller's log.
Wicomico	—	—	—	—,E	—	—	—	D	—	Went dry, 1948.
do	26.46[m]	—	7/27/53	—,E	—	—	—	D,F	—	Dry, July, 1953.
do	—	—	—	S,H	—	—	—	D	—	
do	52	—	—	C,W	—	—	—	D,F	—	
do	—	—	—	J,E	—	—	—	D	46(?)	Dry. summer, 1954.
do	—	—	—	S,E	—	—	—	D,F	—	Dry. summer, 1948.
do	19	—	—	S,E	—	—	—	D,F	—	Filter.
do	18.93[m]	—	8/5/53	—,E	—	—	—	D	—	
do	—	—	—	S,E	—	—	—	D	—	Dry. 1952.
do	—	—	—	S,E	—	—	—	C	—	Gas station and restaurant.
do	10.62[m]	—	9/1/53	S,E	—	—	—	F	—	Two other wells at this site.
Patapsco	73.36[m]	98	11/18/53	NI	100	11/18/53	4.1	N	—	Supplies housing development. See driller's log.
Potomac group	11	30	1/19/51	N	30	1/19/51	1.6	N	—	Water poor. See driller's log.
Patapsco(?)	—	—	—	N	—	—	—	N	—	Abandoned, pumped sand. See driller's log.
do	—	159	5/11/50	T,E	45	—	—	P	—	State Park. Water slightly irony. See driller's log.
do	9.7	60	4/9/51	C,E	40	4/9/51	.8	C	—	Water reported irony. See driller's log.
Raritan	—	—	—	—,E	28	5/18/50	—	D	68	Field test: Fe 4.0 ppm, H 17 ppm, pH 6.5.
do	32.5	60	7/5/50	J,E	30	7/5/50	1.1	D	—	Water reported sightly irony.
do	38	62	1/17/51	—,E	30	1/17/51	1.3	D	70	Field test; Fe 0.2 ppm, H 54 ppm, pH 7.3. See driller's log.
do	31.5	60	7/15/50	—	15	7/15/50	.5	D	59	Field test; Fe 0.5 ppm, H 34 ppm, pH 6.5.
do	43	80	6/—/51	—	30	6/—/51	.8	D	62	Field test: Fe 0.4 ppm, H 53 ppm, pH 6.5
do	45	65	7/1/52	—	30	7/1/52	1.5	D	—	Water reported irony.
do	51	90	7/—/50	J,E	20	7/—/50	.5	D	—	Do
do	57	80	6/—/50	—	30	6/—/50	1.3	D	—	Do
do	70	102	7/—/50	J,E	30	7/—/50	.9	C	—	Supplies thirty cabins in the summer. Water reported irony.
do	57	80	6/9/50	—	36	6/9/50	1.6	D	—	See driller's log.
do	48.5	63	8/18/50	—	20	8/18/50	1.4	D	—	Field test: Fe 0.3 ppm, H 34 ppm, pH 7.
do	60.1	—	8/15/51	—	—	—	—	D	—	Water reported irony. See drillers log.
do	61	77	8/9/51	—	20	8/9/51	1.3	D	—	
do	42	60	1/18/52	—	30	1/18/52	1.7	D	68	Field test; Fe 1.5 ppm, H 17 ppm, pH 6.5.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Dd 18	Davis	J. N. Unruh	1950	55	Drilled	103	4-3	99	4
Dd 19	Henry	do	1950	40	do	109	4-3	105	4
Dd 20	Mrs. Bave	do	1950	30	do	73	4-3	68	4
Dd 21	G. Sasso	do	1951	30	do	101	4-3	97	4
Dd 22	Thompson	do	1950	45	do	107	4-3	103	4
Dd 23	R. E. Bowers	Ennis Brothers	1950	30	do	89	4	85	5
Dd 24	Roy A. Porter	do	9151	18	do	112	4	106	5
Dd 25	Lawrence Little	do	1951	30	do	69	4	64.5	5
Dd 26	E. A. Bilbrough	do	1952	30	do	85	4	78	5
Dd 27	Charles A. Safka	do	1952	30	do	85	4	80	5
Dd 28	Paul De Tramble	do	1951	30	do	53	4	48	5
Dd 29	Henry Gessner	do	1951	30	do	50	4	45.5	5
Dd 30	Harry Peterson	L. T. Walton	1953	20	do	40	6	36	—
Dd 31	L. D. Snyder	Ennis Brothers	1952	25	do	49	—	44	5
Dd 32	Cornelius Kelly	do	1953	20	do	70	4	64	5
Dd 33	Woodrow Steele	do	1953	20	do	82	4	77	5
Dd 34	Wm. J. Getty	do	1952	60	do	144	4	128	5
Dd 35	J. C. Hayes	do	1953	40	do	126	4	120	8.6
Dd 36	B. D. Gilbert	do	1953	45	do	72	4	65	8.7
Dd 37	I. W. Jeanes	J. N. Unruh	1951	60	do	145	4	146	8
Dd 38	Do	do	1951	60	do	137	4-3	129	8
Dd 39	E. K. Brown	Ennis Brothers	1951	40	do	81.6	4	69	16.5
Dd 40	James Thompson	Fred Thorngate	1950	50	do	253	4	—	—
Dd 41	A. L. Ward	Middletown Well Drlg. Co.	1948	80	do	—	—	—	—
Dd 42	J. C. Hunter	J. N. Unruh	—	85	do	165-170	—	—	—
Dd 43	Mrs. Beulah Wooleyham	Ennis Brothers	1940	80	do	185	4	—	—
Dd 44	John Edmonson	—	—	20	Spring	—	—	—	—
Dd 45	Walter Booth	—	—	80	Dug	25	—	—	0
Dd 46	J. S. Frazer	Shannahan	1933	65	Drilled	110	10	—	—
Dd 47	A. H Hershey	Ennis Brothers	1949	30	do	128	4	86	5
Dd 48	J. C. Flannagan	do	1949	45	do	69	4	65	5
Dd 49	Dept. of Forests and Parks	Layne-Atlantic Co.	1949	100	do	146	6	125	10
Dd 50	Dr. D. W. Lewis	Ennis Brothers	1949	30	do	82	4	76	5
Dd 51	Newcomb	J. N. Unruh	1953	85	do	159	4	—	—
Dd 52	Mary White	do	1949	40	do	100	4-3	96	4
Dd 53	Michael Tinko	do	1949	60	do	78	4-3	74	4
Dd 54	Harry Smith	do	1950	25	do	50	4-3	42	8
Dd 55	Mrs. Baumann	do	1953	30	do	127	—	—	—
Dd 56	Jack Dumbler	do	1949	50	do	115	4	111	4

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Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Raritan	56.5	80	6/—/50	J,E	30	6/—/50	1.3	D	—	Water reported irony.
do	70	90	8/—/50	—	30	8/—/50	1.5	D	—	Do
do	45	60	8/—/50	—	25	8/—/50	1.7	D	—	
do	62	80	6/—/51	—	30	6/—/51	1.7	D	—	
do	63	80	10/—/50	—	20	10/—/50	1.2	D	—	See driller's log.
do	28	40	5/1/50	J,E	28	5/1/50	2.3	D,F	—	Do
do	15	60	8/—/51	J,E	40	8/—/51	.9	D	—	Water reported very irony. See driller's log.
do	31.7	58	9/12/51	J,E	40	9/12/51	1.5	D	—	Water reported irony.
do	28.8	60	1/18/52	J,E	40	1/18/52	1.3	D	—	Do
do	29.8	60	1/18/52	J,E	40	1/18/52	1.3	D	—	Water reported irony. See driller's log.
do	24.7	47	6/29/51	J,E	20	6/29/51	.9	D	—	Water reported irony.
do	32.5	40	9/—/51	J,E	11	9/—/51	1.5	D	—	Do
do	25	35	1/30/53	NI	7	1/30/53	.7	D	—	
do	26	48	11/28/52	T,E	25	11/28/52	1.1	D	—	
do	11.2	58	5/28/53	NI	40	5/28/53	.9	D	—	
do	19	63	6/12/53	—	40	6/12/53	.9	D	—	
do	54.5	83	7/6/53	NI	40	7/6/53	1.4	D	68	Static water level 49.75 ft. below land surface, July 6, 1953. Field test: Fe 3.0 ppm, H 17 ppm, pH 6.3.
do(?)	38	103	5/27/53	T,E	40	5/27/53	.6	D	65	
Raritan	4	42	4/24/53	J,E	40	4/24/53	1.1	D	—	
do	59	100	1/—/51	J,E	50	1/—/51	1.2	D	—	Water reported irony. See driller's log.
do	62	100	2/—/51	—	35	2/—/51	.9	D	—	See driller's log.
do	42.8	60	8/10/51	J,E	40	8/10/51	2.3	D	—	
Patapsco	30	—	—	C,E	—	—	—	C	—	Tavern. Screen used; length unknown.
—	—	—	—	J,E	—	—	—	D	—	Water reported very irony.
Magothy	—	—	—	J,E	—	—	—	D	—	Water reported very irony. Filter used.
Raritan	—	—	—	—	—	—	—	D,F	—	Water reported very irony. H_2S. Screen used; length unknown. See driller's log.
Talbot	—	—	—	N	—	—	—	D	—	Flow slight. Never dry; slightly cloudy. Seepage spring.
Wicomico	20	—	—	S,H	—	—	—	D	—	
Raritan	55–60	—	—	J,E	—	—	—	D,F	—	Screen used; length unknown. Gravel packed.
do	38.7	70	6/1/45	—	40	6/1/45	1.2	D	—	See driller's and sample logs.
do	43	65	8/25/59	—	40	8/25/49	1.8	D	—	
Patapsco	100	—	7/11/49	T,E	30	7/11/49	—	P	—	State Park. See driller's log.
Raritan	34.7	70	6/7/49	—	25	6/7/49	.7	D	—	See driller's log.
Magothy	76.5	81	7/—/53	—	15	7/—/53	3.3	D	57	See chemical analysis. See driller's and sample logs.
Raritan	38	60	9/17/49	J,E	15	9/17/49	.7	D	—	
do	27	60	8/20/49	—	20	8/20/49	.6	D	—	
do	2	40	9/—/50	—	20	9/—/50	.5	D	—	Water reported irony.
do	31	40	—	—	15	—	1.7	D	—	See sample log.
do	64	80	6/6/49	J,E	20	6/6/49	1.3	D	—	Water reported irony.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Dd 57	Mrs. Williams	—	—	80	Dug	37	—	—	0
Dd 58	Russell Price	—	—	80	do	35	48	—	0
Dd 59	Morning Cheer, Inc.	Stolzfuss(?)	1953	50	Drilled	170-180	8	—	5
Dd 60	Cary W. Bok	—	—	5	Spring	—	—	—	—
Dd 61	G. H. Bathon	Ennis Brothers	1949	20	Drilled	279	6	264.6	5
Dd 62	Dept. of Forests & Parks	—	—	140	do	300+	6	—	—
Dd 63	Lindsey Price	—	—	65	Dug	35	48	—	0
Dd 64	Linn Sprankle	—	—	70	do	—	—	—	0
Dd 65	Harvey E. Reynolds	Ennis Brothers	—	80	Drilled	250	—	—	—
Dd 66	Do	do	—	30	do	—	3	—	—
Dd 67	Wm. Drumheller	—	1941±	50	do	160	—	60	—
De 1	N. F. Baldwin	J. N. Unruh	1950	70	do	188	4	180	8
De 2	Lillian Snow	do	1952	18	do	65	4	61	4
De 3	J. Denston	F. R. Kielkopf	1952	30	do	128	4	12	8
De 4	D. Mattasino	J. N. Unruh	1951	25	do	88	6	80	8
De 5	Eleanor Hosie	Ennis Brothers	1952	60	do	95	4	88	5
De 6	Harry A. Hersker	do	1949	20	do	146	4	117	5
De 7	J. A. Hull, A. Kuschan	do	1946	10	do	121	4	—	5
De 8	W. T. & A. B. Morrison	do	1946	20	do	109	4	—	5
De 9	John A. Hull	do	1946	40	do	106	4	—	5
De 10	W. W. Broadwater	do	1949	20	do	98	4	92	5
De 11	Buckley	J. N. Unruh	1951	28	do	67	—	—	—
De 12	Do	—	—	28	Dug	16	—	—	—
De 13	John Losten	—	—	80	do	20	36	—	0
De 14	R. C. Shaw	Ennis Brothers	1945	28	Drilled	124	4	—	10
De 15	Bonifacino	J. N. Unruh	1951	20	do	90	4-3	86	4
De 16	Jefferis	do	1951	20	do	128	4-3	124	4
De 17	G. M. Bellanca	do	1949	70	do	107	4	103	4
De 18	George Moore	—	—	78	Dug	19	—	—	0
De 19	Francis T. Chambers	Ennis Brothers	1946	70	Drilled	163	6	—	—
De 20	Norman Baldwin	—	1920	70	Dug	72	—	—	0
De 21	George Fasbenner	—	—	60	do	—	—	—	0
De 22	H. B. Bouchelle	—	—	80	do	28	—	—	0
De 23	Fauconniere	—	—	65	do	23	—	—	—
De 24	C. G. Engstrom	Ennis Brothers(?)	—	60	Drilled	200	—	—	—
De 25	James A. Byard	—	1920	60	do	135	4	—	—
De 26	Holden Ireland	—	—	60	Dug	25	—	—	0
De 27	H. R. Sharp	Ridpath and Potter	1921	40	Drilled	156	4½	—	—
De 28	Holden Ireland	—	—	70	Dug	—	—	—	0

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Water-bearing unit	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Wicomico	37.2[m]	—	9/25/53	C,G	—	—	—	D,F	—	Water reported irony,
do	—	—	—	J,E	—	—	—	D	—	
Potomac group	70–80	—	12/1/53	J,E	—	—	—	D	—	Do
Talbot	—	—	—	N	—	—	—	D	—	
Potomac group	—	72	8/27/49	J,E	75	8/27/49	—	D,F	—	Filter. See driller's log.
do	—	—	—	N	—	—	—	N	—	State Park. Abandoned.
Wicomico	32.58[m]	—	12/17/53	S,H	—	—	—	D	—	
do	—	—	—	S,H	—	—	—	D,F	—	
Raritan	—	—	—	C,E	—	—	—	D,F	—	
—	—	—	—	C,E	—	—	—	F	—	
Raritan	—	—	—	—	—	—	—	D	56.5	Field test: Fe 4.0 ppm, H 17 ppm, pH 7.
Magothy	70	105	12/—/50	J,E	15	12/—/50	.4	D	60	See driller's log.
do	15	25	3/10/52	—,E	25	3/10/52	2.5	D	67	
Raritan	18	60	7/7/52	—,E	20	7/7/52	.5	D	—	
Magothy	19	70	1/9/51	J,E	30	1/9/51	.6	D	64	Water reported slightly irony. Filter.
Matawan	59	85	6/2/52	J,E	15	6/2/52	.6	D	—	Water reported slightly hard. See driller's log.
Raritan	19.7	100	4/25/49	—	50	4/25/49	.6	D	67	Field test: Fe 6.0 ppm, H 68 ppm, pH 7.5. See driller's log.
do	9.8	29	7/6/46	—	12	7/6/46	.6	D	57	See driller's log and chemical analysis.
Magothy	24.6	60	7/21/46	—	40	7/21/46	1.1	D	—	See driller's log.
Raritan	30	50	8/21/46	—	23	8/21/46	1.2	D	59.5	Do
Magothy	—	80	4/6/49	—	25	4/6/49	—	D	—	Water reported irony. See driller's log.
do	—	—	—	—	—	—	—	N	—	See driller's and sample logs.
Wicomico	12.34[m]	—	11/27/51	—,E	—	—	—	D	—	Well 70 feet from edge of bluff.
do	13.62[m]	—	8/5/53	—,E	—	—	—	D	—	Water reported hard.
Raritan	20	28	10/21/45	—	12	10/21/45	1.5	D	—	Field test: Fe 6.0 ppm, H 54 ppm, pH 7.5. See sample log.
do	16	60	8/—/51	—	20	8/—/51	.5	D	—	Water reported irony.
do	18.5	80	8/—/51	—	20	8/—/51	.3	D	62.5	See driller's log.
Magothy	7	27	9/3/49	J,E	7	9/3/49	.4	D	—	Water reported very irony. See driller's log.
Wicomico	4	—	8/19/53	—	—	—	—	D,F	—	
Raritan	79	100	11/18/46	—	40	11/18/46	1.9	D	—	Water reported irony. Screen used; length unknown. See driller's log.
Wicomico	70	—	—	—,E	—	—	—	D,F	—	Water reported slightly irony.
do	—	—	—	—	—	—	—	D,F	—	Supplies two houses. Another dug well at barn.
do	—	—	—	S,E	—	—	—	D	—	
do	20.65[m]	—	9/1/53	—,E	—	—	—	F	—	Supplies 50 head of cattle. Another dug well at house.
Raritan	—	—	—	—,E	—	—	—	D,F	63	Much iron precipitated.
do	—	—	—	C,E	—	—	—	D	57	Iron precipitated. Filter.
Wicomico	—	—	—	S,G	—	—	—	D,F	—	
Raritan	30	—	—	C,E	—	—	—	D	61.5	Supplies two houses. Field test: Fe 0.4 ppm, H 17 ppm, pH 6.3.
Wicomico	—	—	—	—	—	—	—	D	—	Another well at barn; not used.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
De 29	Louis A. Wiebe	—	—	60	Dug	22	20	—	0
De 30	Mrs. Al Smith	—	1952	80	do	27	—	—	0
De 31	Steve Pearce	—	—	85	do	30	—	—	0
De 32	Eben B. Frazer	—	—	40	do	11	48	—	0
De 33	Vernon Whelan	—	—	80	do	75	—	—	0
De 34	J. D. Otley	—	—	75	do	62	60	—	0
De 35	Julian Hurtt		—	70	do	46	48	—	0
De 36	Clark Estate		—	75	do	65	60	—	0
De 37	Walter Michalski		—	70	do	43	—	—	0
De 38	Harold Strong, Jr.	—	—	80	do	40	—	—	0
De 39	R. J. Christopher	—	—	65	Drilled	—	4	—	—
De 40	D. C. Elliott	—	1949±	20	do	150	—	—	—
Df 1	H. O. Drobeck	Ennis Brothers	1951	70	do	237	4	162	5
Df 2	Mrs. A. W. Foard	—	—	60	Dug	17	48	—	0
Df 3	H. C. Pouska	—	—	80	do	25	48	—	0
Df 4	Mrs. Helen Steele	—	—	65	do	35	—	—	0
Df 5	Jefferson Pool	—	—	70	do	19	—	—	0
Df 6	Du Pont(?)	—	—	60	do	44	—	—	0
Df 7	Mrs. Leamont Jones	—	—	75	do	—	—	—	0
Df 8	Juanita M. Hornberger	—	—	75	do	42	—	—	0
Df 9	Wm. Alfree	—	—	60	do	35	—	—	0
Df 10	Tullard Buckworth	—	—	60	do	40	—	—	0
Df 11	Edward Hall	Ennis Brothers	1947	40	Drilled	88	4	82	5
Df 12	Albert T. Sartin	—	—	65	Dug	36	48	—	0
Df 13	Gilbert Collins	—	—	65	do	35	48	—	0
Df 14	Wm. Price, III	Ennis Brothers	1948	65	Drilled	163	4	—	5
Df 15	J. G. Smith	do	1938±	60	do	—	—	—	—
Df 16	Simpson Dean	—	—	80	Dug	35	—	—	0
Df 17	John F. Metten	—	—	20	do	33±	—	—	0
Df 18	—	—	—	20	do	17	48	—	0
Df 19	Frank Zeron	—	—	65	do	60	—	—	0
Df 20	Myrtle B. Wilson	—	—	60	do	30	—	—	0
Df 21	David S. McNatt	—	—	60	do	30	—	—	0
Df 22	Alfred Phillips	Shannahan	1940	65	Drilled	345	4	—	—
Df 23	Albin Dearing	—	—	60	Dug	48	48	—	
Df 24	Julian Kirk	Middletown Well Drlg. Co.	1953	75	Drilled	145	—	—	—
Df 25	Richard D. Aiken	—	—	60	Dug	45	—	—	0
Df 26	Jenny G. Price	—	—	70	do	40–45	48	—	0
Df 27	Do	—	—	70	do	18–20	—	—	0
Df 28	C. M. Lurty	—	—	70	do	18	—	—	0
Ec 1	Grove Pt. Girl Scout Camp	Ennis Brothers	1950	40	Drilled	82	6½	78.5	5

—Continued

Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Wicomico	19.1 ^{m}	—	9/23/53	—,E	—	—	—	D,F	—	
do	—	—	—	—,E	—	—	—	D,F	—	
do	19.46 ^{m}	—	9/23/53	S,H	—	—	—	D	—	
do	6.66 ^{m}	—	9/23/53	S,H	—	—	—	F	—	
do	4	—	9/23/53	C,W	—	—	—	D,F	—	
do	55.96 ^{m}	—	12/21/53	C,W	—	—	—	D,F	—	Water reported irony.
do	36.16 ^{m}	—	12/21/53	C,E	—	—	—	D,F	—	
do	18-20	—	—	C,W	—	—	—	D,F	—	Water reported slightly hard.
do	37.35 ^{m}	—	12/21/53	J,E	—	—	—	D,F	—	Water reported slightly irony.
do	35	—	12/21/53	J,E	—	—	—	DF	—	
—	—	—	—	C,E	—	—	—	D,F	—	Water reported hard, slighty irony.
Raritan	—	—	—	—,E	—	—	—	D	57	Filter.
do	66.5	100	7/11/51	J,E	40	7/11/51	1.2	D,F	—	Water reported poor, irony. Filter. See driller's log.
Wicomico	10.58 ^{m}	—	8/5/53	B,H	—	—	—	D	—	
do	18.05 ^{m}	—	8/5/53	J,E	—	—	—	D F	—	Water reported irony.
do	—	—	—	—,E	—	—	—	D,F	—	
do	15.04 ^{m}	—	8/5/53	T,E	—	—	—	D	—	
do	35.88 ^{m}	—	8/5/53	—	—	—	—	D	—	
do	—	—	—	S,H	—	—	—	D	—	
do	29.35 ^{m}	—	8/24/53	—,E	—	—	—	D,F	—	
do	—	—	—	—	—	—	—	D,F	—	Water reported irony.
do	—	—	—	J,E	—	—	—	D	—	Water reported slightly irony.
Matawan	—	—	—	—,E	—	—	—	D	59	Screen used; length unknown. See driller's log and chemical analysis.
Wicomico	30.40 ^{m}	—	8/24/53	—; W, E	—	—	—	DF	—	
do	21.26 ^{m}	—	8/24/53	S,H; —,E	—	—	—	D,F	—	
Magothy	53	80	6/—/48	J,E	30	6/—/48	1.1	D,F	58	Field test: Fe 1.3 ppm, H 154 ppm, pH 8.3. See driller's log.
—	—	—	—	—,E	—	—	—	D,F	—	
Wicomico	31.89 ^{m}	—	8/27/53	—,E	—	—	—	D,F	—	
do	—	—	—	S,—; —,E	—	—	—	D,F	—	
do	14.7 ^{m}	—	8/27/53	S,H	—	—	—	D,F	—	
do	55	—	8/27/53	—,E	—	—	—	D,F	—	
do	—	—	—	—,E	—	—	—	D,F	—	
do	26.44 ^{m}	—	8/27/53	S,E	—	—	—	D,F	—	
Raritan	—	—	—	J,E	—	—	—	D,F	—	Water reported hard, irony.
Wicomico	41.14 ^{m}	—	12/21/53	C,E	—	—	—	D,F	—	Water reported irony. Supplies two families.
Matawan	—	—	—	C,E	—	—	—	D,F	—	Water reported slightly hard, irony.
Wicomico	—	—	—	J,E	—	—	—	D,F	—	Water reported slightly hard.
do	—	—	—	—,J	—	—	—	F	—	Water reported hard, irony.
do	9	—	10/—/53	S,E	—	—	—	D,F	—	
do	12	—	12/21/53	J,E	—	—	—	D,F	—	Store.
Magothy	47.3	79	2/11/50	J,E	45	2/11/50	1.4	D	53.5	Field Test: Fe 1.0 ppm, H 34 ppm, pH 6.5. See driller's log.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date Completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ec 2	Grove Pt. Girl Scout Camp	Ennis Borthers	1934	45	Drilled	85	—	—	—
Ec 3	W. H. Paxton	do	1951	50	do	79	4	74.8	5
Ec 4	Rodman Woodward	J. N. Unruh	1951	10	do	58	4	54	4
Ec 5	William McDowell	do	1951	10	do	63	4	59	4
Ec 6	J. R. Barger, Jr.	Ennis Brothers	1952	10	do	55	4	50	5
Ec 7	H. C. Miller	do	1950	10	do	58	4	—	5
Ec 8	C. H. Tucker	do	1950	15	do	34	4	32.5	5
Ec 9	Camp Trinity	do	1947	40	do	58	4	—	5
Ec 10	Stanchfield Wright	do	—	75	do	—	—	—	—
Ec 11	Margaret England	—	1926	90	do	164	6	—	—
Ec 12	W. D. Bidgood	Ennis Brothers	—	80	do	137	4	—	—
Ec 13	Roy V. Lull	do	1953	50	do	60	4	55	5
Ec 14	Ted Zang	—	1952	10	do	56	4	49	5
Ed 1	Isabell Manloff	—	Very old	65	Dug	80	48	—	0
Ed 2	Tony Haggerty	—	—	60	do	80	60	—	0
Ed 3	David Crawford	J. N. Unruh	1950	75	Drilled	94	4	90	4
Ed 4	F. D. Singelton	F. R. Kielkopf	1953	60	do	137	4-3	129	8
Ed 5	Thomas L. Green	Middletown Well Drlg. Co.	1946	60	do	—	—	—	—
Ed 6	Do	do	1952	40	do	92	—	—	—
Ed 7	O. S. Anderson	—	—	39	Dug	39	—	—	0
Ed 8	E. Spry	—	—	80	do	47	—	—	0
Ed 9	J. B. Liason	—	—	25	Spring	—	—	—	—
Ed 10	Charles Long	Ennis Brothers(?)	—	80	Drilled	200	4	—	—
Ed 11	J. M. Willis	Thorngate	1949	70	do	82	6	—	—
Ed 12	Do	do	—	80	do	75	6	—	—
Ed 13	Do	—	—	80	Dug	82	48	—	0
Ed 14	Gordon Jess	Ennis Brothers	—	50	Drilled	175	4	165	10
Ed 15	H. K. Miller	—	—	80	Dug	47	—	—	0
Ed 16	James Bayard	—	1930	5	Drilled	82	6	—	—
Ed 17	Mrs. Emma Craig	—	—	60	Dug	39	—	—	0
Ed 18	Thomas Firth	—	—	65	do	82	60	—	0
Ee 1	State Roads Commission	Coop. Ground-Water Staff	1949	68	Driven	20	1	—	—
Ee 2	Dr. Gilfillian	do	1951	68	do	22	1	—	—
Ee 3	Milton Brown	Ennis Brothers	1946	70	Drilled	336	6	—	12
Ee 4	Reese Short	J. N. Unruh	1951	80	do	77	4	66	—

—*Continued*

Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Magothy	—	—	—	J,E	—	—	—	D	—	Some iron reported.
do	53.3	77	8/—/51	J,E	20	8/—/51	.8	D	—	See driller's log.
do	6	25	5/—/51	—,E	12	5/—/51	.6	D	—	Water reported poor, irony.
do	6	25	5/—/51	J,E	7.5	5/—/51	.4	D	—	Water reported poor, irony. See driller's log.
do	1.6	40	3/28/52	—,E	30	3/28/52	.8	D	—	Water reported irony. See driller's and sample logs.
do	5	40	10/10/50	—,E	30	10/10/50	.9	D	—	Water reported irony. See driller's log.
Talbot	10	25	10/13/50	—	12	10/13/50	.8	D	—	Do
Magothy	40	52	6/5/47	—	35	6/5/47	2.9	D	—	Screen used; length unknown. See driller's log.
—	—	—	—	C,E	—	—	—	D,F	—	Filter. Supplies three houses.
Magothy(?)	70±	—	9/25/53	C,E	—	—	—	D,F	—	Water reported poor, irony. Filter.
do	70±	—	—	C,W, E	—	—	—	D	—	Fe 7 ppm (reported). Filter.. Screen used; length unknown
Magothy	—	—	—	C,E	15	—	—	D	—	See driller's log.
do	9.3	42	8/29/52	C,E	40	8/29/52	1.2	D	—	Water reported very irony. Filter used. See driller's log.
Wicomico	—	—	—	C,W, G	—	—	—	D	—	Dry several times.
do	—	—	—	C,W	—	—	—	F	—	Do
Matawan	4	25	12/—/50	—	40	12/—/50	1.9	D	—	Water reported irony. See driller's log.
Magothy	70	105	7/—/53	J,E	15	7/—/53	.4	D	—	See driller's log.
Monmouth	—	—	—	— E	—	—	—	D,F	—	Very irony. Filters.
do	—	—	—	J,E	—	—	—	F	56	Field test: Fe 9.0 ppm, H 34 ppm.
Wicomico	35	—	—	J,E	—	—	—	D,F	—	
do	40.66 m	—	9/24/53	J,E	—	—	—	D,F	—	Water reported irony.
Talbot	—	—	—	—	—	—	—	D,F	—	Do
Monmouth	—	—	—	J,E	—	—	—	D,F	—	Water reported very irony.
do	—	—	—	J,E	—	—	—	D	—	
do	—	—	—	N	—	—	—	N	—	
Wicomico	67±	—	—	J,E	—	—	—	D,F	—	
Magothy	71	100	4/14/45	—,E	30	4/14/45	1.0	D,F	—	See driller's log.
Wicomico	36.93 m	—	9/25/53	—,E	—	—	—	D,F	—	
Monmouth	—	—	—	—,E	—	—	—	N	—	Water unfit to drink.
Wicomico	33.93 m	—	9/25/53	J,E	—	—	—	D,F	—	Went dry in the 1930s. Another dug well at barn.
do	71	—	1953	C,W	—	—	—	D,F	—	Water reported hard.
do	2.42 m	—	5/30/52	N	—	—	—	N	—	Observation well 1949-1952. Well destroyed.
do	14.74 m	—	12/9/55	N	—	—	—	N	—	Observation well 1951–.
Raritan(?)	65	100	7/31/46	J,E	45	7/31/46	1.3	D,F	60	Field test: Fe 0.5 ppm, H 51 ppm, pH 8.5. See driller's and sample logs.
Monmouth(?)	14	50	7/—/51	J,E	7.5	7/—/51	.2	D	—	Water reported very irony. Filter. See driller's log.

TABLE 45

Well number (Ce-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ee 5	J. R. Redding	Ennis Brothers	1951	70	Drilled	87	4	81.5	0
Ee 6	H. R. Cole	—	—	25	—	—	—	—	—
Ee 7	J. R. Taylor	Ennis Brothers	1952	35	Drilled	282	4	277	5
Ee 8	J. Pierce	do	1951	65	do	56	4	50.5	5
Ee 9	Pierce Brothers	M. A. Pentz	1952	55	do	118	4	113	—
Ee 10	Douglas Ernest	Ennis Brothers	1952	85	do	141	4	135	5
Ee 11	Town of Cecilton	do	1953	80	do	274	6	262	16
Ee 12	Board of Education	J. N. Unruh	1950	75	do	194	6	189	5
Ee 13	N. F. Taylor	Thorngate	1950	80	do	145	4	85	—
Ee 14	Mrs. Wm. T. Cavender	—	—	50	Dug	15	—	—	0
Ee 15	Mrs. E. Cruickshank	Thorngate	1950	80	Drilled	190	—	—	—
Ee 16	R. L. Dodge & L. F. Livingston	Ennis Brothers	1941	40	do	290	6	—	—
Ee 17	Bradford W. O'Neal	—	—	75	Dug	25	48	—	0
Ee 18	Andrew Pearce	—	—	70	do	32	48	—	0
Ee 19	Elwood Burris	—	—	85	do	30	48	—	0
Ee 20	Board of Education	—	1938	75	Drilled	—	4	—	—
Ee 21	Holiness Christian Church	Ennis Brothers	1949	60	do	110	4	—	—
Ee 22	Sassafras Boat Co.	—	—	15	Dug	23	60	—	0
Ee 23	Do	—	—	10	do	14	60	—	0
Ee 24	Robert H. Cook	Thorngate	1950±	60	Drilled	80	—	—	—
Ee 25	Do	—	—	70	Dug	61	—	—	0
Ee 26	Marshall Budd	—	—	70	do	66	60	—	0
Ee 27	— Mathews	—	—	79	do	15±	—	—	0
Ee 28	Porter Davis	J. N. Unruh	1955	80	Drilled	289	4	281	5
Ef 1	Charles H. Moloney	Ennis Brothers	1947	72	do	31	4	—	5
Ef 2	Marshall Smith	—	—	70	Dug	30	—	—	0
Ef 3	Frances Davis	—	—	60	do	28	48	—	0
Ef 4	Davis Sisters	—	—	65	do	57	60	—	0
Ef 5	Douglas Ernest	—	—	65	do	35	—	—	0
Ef 6	Olin S. Davis, Jr.	—	—	65	do	31	48	—	0
Ef 7	Margaret S. Robinson	—	—	20	do	40	—	—	0
Ef 8	S. D. Peverley	—	—	60	do	33	—	—	0

—*Continued*

Water-bearing unit	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Aquia	69.8	86.3	7/5/51	J,E	8	7/5/51	0.5	D	58	Field test: Fe 0.2 ppm, H 17 ppm, pH 6.5. See driller's log and chemical analysis.
—	—	—	—	J,E	—	—	—	D	—	
Magothy	21.7	100	7/17/52	J,E	25	7/17/52	.3	D	—	See driller's and sample logs.
Aquia	28.8	52	1/30/51	J,E	30	1/30/51	1.3	D,F	56.5	See driller's log.
Monmouth	—	—	—	J,E	—	—	—	F	56.5	
Matawan	39	82	6/10/52	J,E	40	6/10/52	.9	D	—	Supplies four families. See driller's and sample logs. Water reported slightly irony, very hard. Screen used; length unknown.
Magothy	65	100	2/4/53	T,E	75	2/4/53	2.1	P	58	Fire house. Field test: Fe 1.0 ppm, H 120 ppm, pH 8.3. See chemical analysis. See driller's and sample logs.
Matawan	35	80	11/—/50	—	20	11/—/50	.4	S	66	See driller's log.
Monmouth	25	—	4/—/50	—	—	—	—	D	—	Screen used; length unknown.
Wicomico	10.35 [m]	—	12/17/53	S,H	—	—	—	D	—	
Matawan	38	—	12/—/50	J,E	—	—	—	D,F	—	Do
Magothy	—	—	—	J,E	—	—	—	D	—	
Wicomico	18	—	—	S,H	—	—	—	D	—	
do	—	—	—	J,E	—	—	—	D	—	Water reported hard, irony. Low in summer.
do	20±	—	12/21/53	J,E	—	—	—	D,F	—	Water reported slightly hard.
—	—	—	—	S,E	—	—	—	S	61	Field test: Fe 0.2 ppm, H 154 ppm, pH 8.2.
Matawan(?)	—	—	—	C,E	—	—	—	D	—	Screen used; length unknown.
Talbot	12.8	—	12/22/53	S,E	—	—	—	C	—	Boat yard.
do	5.99 [m]	—	12/22/53	J E	—	—	—	C	—	Boat yard. Filter used.
Monmouth	—	—	—	J,E	—	—	—	D	—	Water very irony and hard. Filter.
Wicomico	53.39 [m]	—	12/22/53	C,E	—	—	—	D	—	Water reported hard, irony.
do	62.3 [m]	—	12/22/53	C,W	—	—	—	D,F	—	
do	—	—	—	C,H	—	—	—	D	53	
Magothy	66	85	3/20/55	J,E	30	3/20/55	1.6	C	—	Pumping test. See driller's log.
Aquia	8.8	28	9/12/47	—	42	9/12/47	2.2	D	—	See driller's log.
Wicomico	—	—	—	S,E	—	—	—	D	—	Water reported slightly hard.
do	20.97 [m]	—	12/21/53	S,H	—	—	—	D	—	
do	55.23 [m]	—	12/22/53	C,W	—	—	—	D,F	—	
do	26.23 [m]	—	12/22/53	J,E	—	—	—	D,F	—	
do	24.79 [m]	—	12/22/53	J,E	—	—	—	D,F	—	
do	—	—	—	S,E	—	—	—	D	—	
do	28.6 [m]	—	12/22/53	J,E	—	—	—	D	—	Water reported irony.

TABLE

Records of Wells and

Water level: Measured water levels are designated by "m".
Pumping equipment: Method of lift: B, bucket; C, cylinder; J, jet; N, none; NI, pump to be installed; S, suction; T, tur
Type of power: E, electricity; G, gasoline; H, hand; W, wind.
Use of Water: C, commercial; D, domestic; F, farm; N, not used; P, public supply; S, school.
Remarks: Chemical analyses referred to are in Table 44.
Well logs referred to are in Tables 49 and 52.

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ac 1	Walter Harris	Ennis Brothers	1948	85	Drilled	137	6	—	10
Ac 2	Do	Army Engineers	1942–43	2	Driven	14	—	—	—
Ac 3	A. N. Staveley (Y.M.C.A.)	J. N. Unruh	1950	80	Drilled	109	6	103	6
Ac 4	Do	do	1949	60	do	141	4	132	8.5
Ac 5	Estelle D. Roberts	Ennis Brothers	1946	70	do	109	6	—	—
Ac 6	L. E. Snodgrass	do	1949	30	do	91	4	83	5
Ac 7	C. T. Kelcb	do	1950	40	do	86	4	80.8	5
Ac 8	Walter Harris	—	—	85	Dug	100	—	—	—
Ac 9	Fair Promise Farm	—	—	80	Drilled	—	—	—	—
Ac 10	Do	—	1936	5	do	—	—	—	—
Ac 11	J. L. E. Crothers	Ennis Brothers	1950	50	do	107	4	96	5
Ac 12	Deringer	—	—	60	Dug	63	—	—	—
Ac 13	E. Roberts	—	—	20	Spring	—	—	—	—
Ac 14	J. Price	—	—	50	Dug	90	40	—	—
Ac 15	L. Storey	—	—	80	do	78	30	—	—
Ac 16	Walter Harris	F. R. Kielkopf	1952	30	Drilled	63	4	59	4
Ac 17	L. E. Snodgrass	Ennis Brothers	1952	30	do	86	4	78	10
Ad 1	Alpheus Smith	do	1945	75	do	76	4	67	10
Ad 2	Mrs. Forrest S. Cave	do	1945	75	do	116	4	80	5
Ad 3	Eliz. and Chas. H. Brice	do	1945	78	do	84	4	70	10
Ad 4	James Rose, Jr.	do	1945	84	do	77	4	72	5
Ad 5	H. C. Gerstung	do	1946	20	do	72	4	—	—
Ad 6	Richard J Krebs	do	1947	50	do	91	4	—	0
Ad 7	Fairfield Farms	do	1947	80	do	169	4	—	5
Ad 8	Chesapeake Hotel	do	1947	20	do	79	4	—	5
Ad 9	Mrs. Walter S. Brice	do	1947	50	do	95	4	—	5
Ad 10	Edna B. Ansley	do	1948	50	do	93	4	—	5
Ad 11	Hotel Betterton	do	1948	30	do	77	4	—	5
Ad 12	Charles Clark	do	1948	75	do	127	4	—	5
Ad 13	John F. Minister	do	1948	40	do	87	4	—	5

46
Springs in Kent County

bine.

Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Raritan	92	125	2/–/48	J,E	50	2/–/48	1.5	D,F	—	Screen used; length unknown. Field test: Fe 0.2 ppm, H 17 ppm, pH 6.5. See driller's log.
Recent	—	—	—	N	—	—	—	N	—	Abandoned. Driven in beach sand.
Raritan	83	99	9/10/50	T,E	30	9/10/50	1.9	P	—	Boys camp. Water reported good. See driller's log.
do	80	117	6/–/49	—	25	6/–/49	.7	D	—	Water reported good. See driller's log.
do	87	95	8/–/46	—	30	8/–/46	3.7	D	—	Water reported good. See driller's and sample logs.
do	44	70	5/–/49	—	15	5/–/49	.6	D	—	See driller's log.
do	84	84.6	6/–/50	—	21	6/–/50	—	D	—	Do
Wicomico	100	—	—	—	—	—	—	N	—	Very little water.
—	—	—	—	T,E	—	—	—	D	—	Fe 0.7 ppm. Dug well 78 ft. deep at same place; dry.
—	—	—	—	—	—	—	—	D	—	Reported to flow at times. Water irony.
Raritan	87.4	104	8/–/50	—	40	8/–/50	2.4	D	—	Water reported good. See driller's log.
Wicomico	57.9[m]	—	9/24/51	J,E	—	—	—	D,F	—	Water reported irony.
do	—	—	—	—	—	—	—	D	—	Water reported good.
do	75	—	9/24/51	J,E	—	—	—	D	—	Water reported irony.
do	72.67[m]	—	9/24/51	J,E	—	—	—	D,F	—	Water reported irony. Low in summer.
Raritan	28	55	2/–/52	—	7	2/–/52	.3	D	57.5	Camp. See driller's log.
do	54	75	3/–/52	—	30	3/–/52	1.4	D	—	See driller's log.
Wicomico	60	69	7/–/45	J,E	3	7/–/45	.3	D	—	Water reported good.
Magothy	58	75	8/–/45	J,E	8	8/–/45	.5	D	—	See driller's log.
Wicomico	65	70	8/–/45	J,E	10	8/–/45	2.0	D	—	Water reported good. See driller's log.
do	60	—	8/–/45	J,E	20	8/–/45	—	D	—	See driller's log.
Magothy(?)	25	50	4/–/46	—	50	4/–/46	2.0	P	60	See chemical analysis.
do	46	80	9/–/47	T,E	30	9/–/47	1.2	D	—	
Magothy	66	89	9/–/47	—	42	9/–/47	1.8	D	—	Field test: Fe 0.1 ppm, H 17 ppm, pH 6.5. See driller's log.
do	30	60	12/–/47	—	50	12/–/47	1.6	C	—	Water reported very irony. Filter. See driller's log.
do	59	70	12/–/47	—	70	12/–/47	6.3	D	—	See driller's log.
do	61	80	2/–/48	—	50	2/–/48	2.6	D	56	Field test: Fe 0.2 ppm, H 34 ppm, pH 6.5. See driller's log and chemical analysis.
do	24.5	63	2/–/48	—	40	2/–/48	1.0	C	—	
do	67	115	3/–/48	—	25	3/–/48	.5	D	58	
do	50	—	7/–/48	T,E	10	7/–/48	—	D	—	Water reported poor, irony. Filter.

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ad 14	Betterton Fire Co.	Ennis Brothers	1948	76	Drilled	85	4	—	5
Ad 15	Rose Worrall	do	1949	75	do	78	4	71.7	5
Ad 16	Paul W. Lang	do	1949	70	do	100	4	93.2	5
Ad 17	Earl H. Cosden	do	1949	70	do	120	4	116	5
Ad 18	Paul Payne	J. N. Unruh	1949	84	do	127	4	119	8.2
Ad 19	John Birk	Ennis Brothers	1953	50	do	84	4	76.9	5
Ad 20	Town of Betterton	—	—	10	Spring	—	—	—	—
Ad 21	Floyd Smith	do	1950	40	Drilled	195	4	187	8
Ad 22	W. J. Dempsey	—	1951	76	Dug	52	—	—	—
Ad 23	N. Price	—	—	60	do	56	72	—	—
Ad 24	—	—	—	80	do	71	53	—	—
Ad 25	C. Diehl	—	—	65	do	52	60	—	—
Ad 26	C. Gustafson	—	—	65	do	65	48	—	—
Ad 27	M. Glenn	—	—	80	do	60	48	—	—
Ad 28	W. Johnston	—	—	70	do	47	40	—	—
Ad 29	M. Webb	—	—	80	do	44	48	—	—
Ad 30	—	—	—	80	do	41	40	—	—
Ad 31	C. Webb	—	—	65	do	50	50	—	—
Ad 32	Russell A. Werner	F. R. Kielkopf	1953	70	Drilled	105	4	97	3
Ad 33	R. J. Hitchner	Ennis Brothers	1951	65	do	102	4	95	5
Ad 34	Miss Louise Crew	J. N. Unruh	1950	80	do	116	4	112	4
Ad 35	George Wilson	Ennis Brothers	1953	85	do	85	4	31.5	5
Ad 36	Sutton	F. R. Kielkopf	1952	60	do	124	4	116	8
Ad 37	John Story	Ennis Brothers	1954	60	do	113	4	108	5
Ad 38	Margaret M. Phillips	do	1953	70	do	116	4	108	5
Ae 1	Chas. F. McCann	—	1928	65	Dug	67	—	—	—
Ae 2	H. E. J. Koedding	Ennis Brothers	1948	40	Drilled	94	4	—	—
Ae 3	John W. Sheetz	J. N. Unruh	1949	30	do	96	4	88	8
Ae 4	Arthur Bundrick	do	1949	65	do	189	4	163	—
Ae 5	Geo. C. Ives	Ennis Brothers	1950	12	do	198	4	190	5
Ae 6	C. Miller	—	—	80	Dug	79	60	—	—
Ae 7	Pond Farm	—	—	80	do	73	48	—	—
Ae 8	A. Knute	—	—	80	do	53	40	—	—
Ae 9	W. Miller	—	—	70	do	30	40	—	—
Ae 10	R. E. Miller	—	—	60	do	57	60	—	—
Ae 11	J. Lague	—	1947	20	do	24	40	—	—

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Sattic	Pumping	Date		Gallons a minute	Date				
Magothy	45	—	7/-/48	—	15	7/-/48	—	P	—	
Wicomico	54	74	3/-/49	—	40	3/-/49	2.0	D	—	
Magothy	63.2	80	5/-/49	—	30	5/-/49	1.7	D	—	
do	74.3	108	6/-/49	—	40	6/-/49	1.2	D	—	Water reported good. See driller's log.
Raritan	69.3	100	7/-/49	T,E	30	7/-/49	.9	D	—	Field test: Fe tr., H 17 ppm, pH 6.5. See driller's log.
do	43	73	11/13/53	—	40	11/13/53	1.3	D	—	Water reported clear.
Wicomico	—	—	—	—	25	12/21/54	—	P	54.5	See chemical analysis.
Raritan	40	60	10/5/50	J,E	15	10/5/50	.7	D	63	Field test: Fe 6.0 ppm, H 34 ppm, pH. 7. See driller's log.
Wicomico	47.5	—	9/24/51	J,E	—	—	—	D	—	Water reported good.
do	48	—	1951	B	—	—	—	D,F	—	Water reported irony. Dry in 1933.
do	64.6	—	9/25/51	—	—	—	—	N	—	
do	42	—	9/25/51	C,E	—	—	—	D,F	—	Water poor, irony. Pumps dry in ½ hour.
do	61	—	9/25/51	J,E	—	—	—	D,F	—	Water reported good. Pumps dry in 1½ hrs.; refills in 20 minutes.
do	8±	—	9/25/51	J,E	—	—	—	D,F	—	Water reported good. Water low, Sept. 1951.
do	44.4	—	9/25/51	—,H	—	—	—	N	—	Possibly contaminated.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported irony.
do	33.3	—	9/25/51	C,W	—	—	—	N	—	
do	46	—	9/25/51	C,W	—	—	—	D	—	Water reported good. Two springs on property.
Magothy	52	—	9/-/53	—	20	9/-/53	—	D	—	See driller's and sample logs.
do	56.5	80	8/-/51	—	40	8/-/51	1.7	D	—	
do	65	95	10/-/50	J,E	15	7/-/50	.5	D	—	Water reported irony. See driller's log.
Wicomico	56	80	2/-/52	—	20	2/-/52	.8	D	—	Water reported good. See driller's log.
Magothy	62	100	5/-/52	—	25	5/-/52	.6	D	—	Water reported irony. See driller's log.
do	53.9	26.1	3/5/54	—	30	3/5/54	1.1	D	—	
do	63	104	5/-/53	—	20	5/-/53	.5	D	—	
Wicomico	—	—	—	C,H	—	—	—	D	—	Water reported slightly irony. Supplies five families.
Matawan	26	60	12/-/48	—	20	12/-/48	0.6	D	—	Field test: Fe 0.6 ppm, H 120 ppm, pH 8.3. See driller's log.
Monmouth	30	60	8/-/49	—	15	8/-/49	.5	D	—	Water reported good. See driller's log.
Magothy	45	80	8/-/49	T,E	15	8/-/49	.4	D	—	Water reported yellow. See driller's log.
Raritan	33.6	100	11/8/50	—	30	11/8/50	.5	D	—	Water reported good. See driller's log.
Wicomico	74.32[m]	—	9/25/51	C,E	—	—	—	D	—	Water reported good.
do	67.75[m]	—	9/25/51	C,W	—	—	—	D,F	—	Water reported good. Supplies three houses.
do	47.41[m]	—	9/25/51	C,W	—	—	—	D,F	—	Water reported slightly irony.
do	—	—	—	J,E	—	—	—	D,F	—	Water reported good.
do	51.94[m]	—	9/25/51	T,E	—	—	—	D,F	—	Do
Talbot	20	—	9/25/51	S,H	—	—	—	D	—	Water reported irony.

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ae 12	M. S. Ford	—	—	60	Dug	66	48	—	—
Ae 13	S. W. Westcott	—	1945	65	Drilled	120	1¼	—	—
Ae 14	A. H. Kosovi	—	1900	15	Dug	15	30	—	—
Ae 15	P. Meyers	—	1890	20	do	30	40(?)	—	—
Ae 16	—	M. A. Pentz	1939	70	Drilled	130	5	—	—
Ae 17	H. S. Ford	—	—	70	Dug	60	50	—	—
Ae 18	Mrs. H. M. Ernest	J. N. Unruh	1950	55	Drilled	82	4	74	8
Ae 19	H. Ludington	do	1951	25	do	89	4	81	8
Ae 20	M. S. Kulp	do	1950	80	do	116	4	94	—
Ae 21	Charles Brown	do	1950	70	do	105	4	84	—
Ae 22	H. B. Cunningham	do	1950	20	do	79	4	71	8
Ae 23	G. L. Felter	do	1950	20	do	79	4	71	8
Ae 24	E. Howell	do	1953	10	do	174	4	166	8
Ae 25	Karpel	M. A. Pentz	1952	70	do	170	4	120	—
Ae 26	P. Wood	Ennis Brothers	1952	15	do	50	4	44.3	5
Ae 27	Voss	J. N. Unruh	1952	40	do	195	4	187	8
Af 1	Ravenwood Farms	Ennis Brothers	1945	70	do	125	6	—	—
Af 2	E. M. Hinton	do	1949	60	do	89	4	83	5
Af 3	M. Anderson	—	1930	20	Dug	28	48	—	—
Af 4	Starkey Farms Co.	Ennis Brothers(?)	1938	60	Drilled	300	4	—	—
Af 5	Do	J. N. Unruh	1951	60	do	327	4	119	8
Af 6	Do	Ennis Brothers(?)	1938	55	do	300	4	—	—
Af 7	Do	do	1938	65	do	300	4	—	—
Af 8	Town of Galena	M. A. Pentz(?)	1942	69	do	152	6	—	—
Af 9	L. S. Peaker	—	1917	65	Dug	43	48	—	—
Af 10	H. W. Blakeslee	Ennis Brothers	1951	60	Drilled	71	2½	66	6.5
Af 11	J. D. Davis	—	1916	70	Dug & driven	60	40–1½	—	—
Af 12	E. W. Ranck	—	—	65	Dug	42	45	—	—
Af 13	J. Pippin	—	—	55	Dug & Driven	35	48–1½	—	—
Af 14	T. L. Roberts	—	—	50	Dug	47	48	—	—
Af 15	Bert	J. N. Unruh	1951	65	Drilled	95	4	87	8

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Wicomico	61	—	9/25/51	J, E	—	—	—	D,F	—	Water reported irony.
Matawan(?)	—	—	—	J,E	—	—	—	D,F	—	Do
Talbot	11.46[m]	—	9/27/51	S,E	—	—	—	D	—	Low at times.
do	25.2	—	9/27/51	C,H	—	—	—	D,F	—	Water reported good. Low at times.
Aquia(?)	60	—	9/27/51	J,E	—	—	—	D,F	—	Water reported good. 110′ drop pipe. Supplies 100 head of cattle.
Wicomico	55.36[m]	—	9/27/51	C,H	—	—	—	N	—	Water reported good. Supply inadequate.
Matawan	46	69	6/-/50	—	10	6/-/50	.4	D	—	See driller's log and chemical analysis.
do	24	60	5/-/51	C,H	20	5/-/51	.6	D	—	See driller's log.
do	54	70	11/-/50	J,E	10	11/-/50	.6	D	61	Field test: Fe tr; H 85 ppm, pH 7.3. See driller's log.
Monmouth-Matawan	51	75	9/-/50	J,E	10	9/-/50	.4	D	—	Water reported good. See driller's log.
Matawan	23	60	10/-/50	J,E	25	10/-/50	.7	D	—	Field test: Fe 0.6 ppm, H 12.0 ppm, pH 8.5. See driller's log.
do	23	60	9/-/50	J,E	30	9/-/50	.8	D	—	Water reported good. See driller's log.
Magothy	4	21	2/5/53	—	8	2/5/53	.5	D	—	Do
Magothy(?)	47	60	5/-/52	—	40	5/-/52	3.1	D	—	Field test: Fe 0.9 ppm, H 119 ppm, pH 8.0. See driller's log.
Matawan	19.5	42	9/-/52	—	30	9/-/52	1.3	D	58	See driller's log.
Raritan	26	40	2/-/53	—	15	2/-/53	1.0	D	—	Field test: Fe 5.0 ppm, H 85 ppm, pH 8.0. See driller's log.
Monmouth	49	60	6/-/45	J,E	65	6/-/45	5.9	D,F	58	See driller's and sample logs.
Aquia	62	78	5/-/49	—	20	5/-/49	1.2	D	58	Field test: Fe 0.2 ppm, H 68 ppm, pH 6.5. See driller's log.
Talbot	24.6	—	9/27/51	C,W	—	—	—	D	—	Water reported good.
Raritan(?)	—	—	—	J,E	—	—	—	F,C	—	Water reported slightly hard, irony. Packing house.
Raritan-Magothy-Matawan-Monmouth(?)	53	80	8/-/51	J,E	50	8/-/51	1.9	F,C	59	Field test: Fe 0.2 ppm, H 68 ppm, pH 8.3. Cannery. See driller's log.
Raritan(?)	—	—	—	—,E	—	—	—	D,F	57	Field test: Fe 0.2 ppm, H 51 ppm, pH 8.3.
do	—	—	—	—,E	—	—	—	D,F	57	Field test: Fe 0.2 ppm, H 68 ppm, pH 8.5.
Monmouth-Matawan	37.9	61.9	11/-/48	T,E	85		3.5	P	—	Field test: Fe 0.5 ppm, H 97 ppm, pH 7.4. See chemical analysis.
Wicomico	39.36[m]	—	9/28/51	C,H	—	—	—	D	—	Water reported slightly irony. Gets low.
Aquia	50	69	4/2/51	—	10	4/2/51	.6	D	—	
Aquia(?)	40	—	1916	—	—	—		N	—	Used as cesspool.
Wicomico	37.88[m]	—	10/17/51	J,E	—	—		D,F	—	Water reported slightly irony. Low at times.
do	—	—	—	C,W	—	—	—	D,F	—	Do
do	44.41[m]	—	10/16/51	C,W	—	—	—	D,F	—	Do
Monmouth	60	84	8/-/51	—	20	8/-/51	.8	D	—	See driller's log.

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Af 16	Andrew Taylor	J. N. Unruh	1951	70	Drilled	104	4	97	8
Af 17	Starkey Farms Co.	do	1951	60	do	102	4	94	8
Af 18	J. E. Wood	F. R. Kielkopf	1953	60	do	98	4	—	—
Af 19	J. Chance	do	1952	60	Dug & drilled	77	4	73	4
Af 20	Stewart Huston	Ennis Brothers	1953	60	Drilled	452	4	396	10
Af 21	Town of Galena	M. A Pentz	1954	69	do	150	8	140	10
Ag 1	P. Blakiston	—	—	50	Dug	40	50	—	—
Ag 2	—	—	—	55	do	39	48	—	—
Ag 3	Edwin C. George	—	—	50	do	32	54	—	—
Ag 4	E. Polk	—	—	65	do	34	48	—	—
Ag 5	Do	—	—	65	Drilled	56	4	—	—
Ag 6	J. D. Locke	—	—	65	Dug	17	48	—	—
Ag 7	A. Davis	—	1949	75	Driven	25	1½	—	—
Ag 8	F. Gill	—	—	65	Dug	15	60	—	—
Ag 9	J. Alexander	—	1906	65	do	43	40	—	—
Ag 10	W. Sproates	—	—	70	do	24	36	—	—
Ag 11	Clayton Johnson	—	—	50	do	37	50	—	—
Ag 12	Brad Johnson	—	1790	65	do	38	48	—	—
Ag 13	Do	—	—	65	do	38	48	—	—
Bb 1	F. C. Russell	Ennis Brothers	1948	20	Drilled	65	6	—	0
Bb 2	Wm. Fairlie	J. N. Unruh	1949	15	do	61	4	56	4
Bb 3	Manor Shores	—	—	20	Dug	30	96	—	—
Bb 4	J. Plummer	—	—	20	do	30(?)	—	—	—
Bb 5	J. S. Williams, Jr.	—	—	40	do	35	44	—	—
Bb 6	Brown-Entrekin	M. A. Pentz	1945	20	Drilled	120	4	—	—
Bb 7	J. E. Maxwell	—	—	38	do	—	—	—	—
Bb 8	L. D. Copeland	—	1932	25	do	95	6	—	—
Bc 1	Supplee-Wills-Jones Milk Co.	M. A. Pentz	1947	80	do	56	3	25	31
Bc 2	A. G LeSage	—	—	48	Dug	16	42	—	—
Bc 3	A. McGregor	—	—	30	do	35	—	—	—
Bc 4	E. H. Skirven	—	—	40	do	22	36	—	—
Bc 5	J. W. Dykes	—	—	35	do	14	60	—	—
Bc 6	—	—	—	80	do	—	—	—	—
Bc 7	W. Weaver	—	—	60	do	24	40	—	—
Bc 8	H. Dill	—	—	70	do	21	48	—	—

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Water-bearing formation	Water level (feet below lad surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Aquia	50	90	1/–/51	—	7.5	1/–/51	0.2	N	—	Water very bad, well abandoned. See driller's log.
Monmouth(?)	41.5	60	8/–/51	J,E	35	8/–/51	1.9	D,F	57	See driller's log and chemical analysis.
Aquia	—	—	—	—	—	—	—	D	58	See driller's and sample logs.
do	52	70	3/–/52	—	12	3/–/52	.7	D	—	Do
Raritan	50	165	8/–/53	—	30	8/–/53	.3	D	—	Field test: Fe 0.6 ppm, H 11 ppm, pH 7.8. See driller's log and chemical analysis.
Monmouth	34	82	2/26/54	—	35	2/26/54	.7	P	—	Stand-by for Af 8. Field test: Fe 0.8 ppm, H 172 ppm, pH 7.3. See driller's log and chemical analysis.
Wicomico	39.68[m]	—	10/17/51	—,E	—	—	—	D	56.5	Water reported slightly irony.
do	34.20[m]	—	10/17/51	C,E	—	—	—	D,F	57	
do	28.92[m]	—	10/17/51	—,E	—	—	—	D,F	57.5	
do	27.55[m]	—	10/17/51	T,E	—	—	—	D	57	Water reported hard, irony.
Calvert(?)	—	—	—	C,W	—	—	—	F	—	Water reported poor, very irony.
Wicomico	12.60[m]	—	10/17/51	S,H	—	—	—	D	63	Low, 10/17/51.
do	7	—	10/17/51	S,H	—	—	—	D	—	Water reported good. Screen used; length unknown.
do	11.03[m]	—	10/17/51	S,E	—	—	—	D,F	60	Water reported good.
do	41	—	10/18/51	J,E	—	—	—	D,F	—	Water reported slightly hard, irony.
do	22.02[m]	—	10/18/51	C,E,W	—	—	—	D,F	—	
do	33.13[m]		10/18/51	C,W	—	—	—	D	56.5	Water reported slightly hard, irony.
do	—	—	—	S,H	—	—	—	D	—	Water reported slightly irony.
do	—	—	—	J,E	—	—	—	D,F	—	Do
Raritan(?)	36.5	64	9/–/48	J,E	50	9/–/48	1.9	F	—	Water reported irony. See driller's log.
Talbot	8	50	4/–/49	—,E	25	4/–/49	.6	D,C	—	Water reported 18 ppm iron. See driller's log.
do	24	—	9/26/51	C,E	—	—	—	D	—	Water reported hard, irony.
do	—	—	—	—,E	—	—	—	D,F	—	
do	—	—	—	C,E	—	—	—	D,F	—	Water reported slightly irony.
Raritan(?)	25	—	9/25/51	J,E	—	—	—	F	—	Water reported irony.
—	—	—	—	—,E	—	—	—	D	—	
Raritan(?)	12	—	10/2/51	S,E	—	—	—	D,F	—	Water reported poor, irony.
Monmouth	11	22	8/–/47	S,E	30	8/–/47	2.7	C	—	Field test: Fe 2.0 ppm, H 34 ppm, pH 5.8. See driller's log.
Wicomico	12	—	9/25/51	S,E	—	—	—	D	—	Water reported hard, irony.
Talbot	—	—	—	S,E	—	—	—	D,F	—	Water reported slightly hard, irony.
do	10	—	9/26/51	S,E	—	—	—	D	—	
do	11.45[m]	—	9/26/51	S,H	—	—	—	D,F	—	
Wicomico	—	—	—	S,H	—	—	—	D,F	—	
do	18	—	9/25/51	S,H	—	—	—	D,F	—	Water reported hard, irony.
do	16.40[m]	—	9/26/51	S,E	—	—	—	D	—	

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bc 9	R. Collins	—	1851	60	Dug	80	42	—	—
Bc 10	B. Magrogan	—	—	80	do	23	42	—	—
Bc 11	H. Eerry	—	—	80	do	25	42	—	—
Bc 12	S. Spray	—	—	65	do	39	40	—	—
Bc 13	J. Younger	—	—	80	do	18	24	—	—
Bc 14	Collie Cove Farm	Johnson	—	80	Drilled	115	8	—	—
Bc 15	M. Fogwell	—	—	60	Dug	46	45	—	—
Bc 16	L. C. Dixon	—	—	25	do	43	48	—	—
Bc 17	J. Myers	—	—	80	do	30	60	—	—
Bc 18	Helen Hinson	—	—	35	do	25	42	—	—
Bc 19	W. Atkinson	—	—	30	do	34	48	—	—
Bc 20	L. C. Dixon	—	1916	25	Dug & driven	45	44	—	—
Bc 21	F. Lamott	—	Before 1938	80	Drilled	100(?)	4(?)	—	—
Bc 22	Do	—	1938	60	do	80-100	6(?)	—	—
Bc 23	Do	—	1938	60	do	130	6(?)	—	—
Bc 24	H. S. Rasin	—	—	80	Dug	45	45	—	—
Bc 25	H. S Lasin	—	—	80	do	45	36	—	—
Bc 26	J. K. Chesney	—	1944	60	do	64	48	—	—
Bc 27	A. L. Harris	—	1945±	80	do	78	42	—	—
Bc 28	L. B. Parsons	—	—	70	do	26	45	—	—
Bc 29	St. James Church	J. N. Unruh	1951	30	Drilled	168	4-3	160	8
Bd 1	Webb Hayes	M. A. Pentz	1947	50	do	80	4	64	—
Bd 2	B. R Fellows	Ennis Brothers	1949	70	do	98	4	93	5
Bd 3	Jewel Bros.	J. N. Unruh	1951	70	do	153	4	145	8
Bd 4	Williams	—	—	70	Dug	41	24	—	—
Bd 5	Silcox	—	—	80	do	24	—	—	—
Bd 6	T. Haddaway	—	1922	70	Driven	32	2	—	—
Bd 7	W W. Walbert	—	1900?	45	Dug	42	28	—	—
Bd 8	A. B. Joiner	—	—	70	Drilled	53	6	—	—
Bd 9	G. N. Baxter	—	1939	65	Dug	18	36	—	—
Bd 10	Mrs. Greenwood	—	1950	80	do	26	36	—	—
Bd 11	Baxter	—	1900	75	do	35	36	—	—
Bd 12	J. E. Fredricks	—	—	70	do	23	30	—	—
Bd 13	S. S. Stickney	—	1900	80	do	29	30	—	—
Bd 14	C. H. Joiner	—	—	82	do	50	30	—	—
Bd 15	G. Haddaway	—	—	70	do	20	30	—	—
Bd 16	S. B. Sutton	—	1830	65	do	50	30	—	—
Bd 17	S. S. Stickney	—	1800	80	do	44	30	—	—
Bd 18	Wm. Knight	—	1800	65	Dug & Driven	70	30-1½	—	—
Bd 19	Wm. Waltbank	—	—	45	Dug	45	30	—	—
Bd 20	Wessell	—	1930	70	Dug & Driven	35	—	—	—
Bd 21	H. Usilton	—	1850	75	Dug	60	30	—	—
Bd 22	D. Scott	—	1935	70	do	30	30	—	—
Bd 23	L. Hepburn	—	—	65	do	40	36	—	—
Bd 24	W. L. Ford	—	1915	65	Dug & Driven	65	30-2	—	—

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Wicomico	—	—	—	J,E	—	—	—	D,F	—	
do	16.7	—	9/30/51	S,E	—	—	—	D,F	—	
do	19.4	—	10/1/51	S,H	—	—	—	D	—	
do	30.99[m]	—	10/1/51	J,E	—	—	—	D,F	—	Water reported slightly irony.
do	12.92[m]	—	10/1/51	S,H	—	—	—	D	—	Low at times.
Raritan(?)	—	—	—	C,E	—	—	—	D,F	—	Water reported hard, irony.
Wicomico	42.10[m]	—	10/1/51	C,H	—	—	—	D,F	—	Do
Talbot	37.77[m]	—	10/2/51	C,E	—	—	—	D,F	—	Water reported irony.
Wicomico	24.8	—	10/2/51	C,E	—	—	—	D,F	—	
Talbot	14.56[m]	—	10/2/51	B,H	—	—	—	D,F	—	
do	28.97[m]	—	10/2/51	J,E	—	—	—	D,F	—	Water reported slightly irony.
do	—	—	—	C,H	—	—	—	D	—	Driven well inside 25-ft dug well.
Raritan(?)	—	—	—	—,E	—	—	—	D	—	Water reported hard, irony.
do	—	—	—	T,E	—	—	—	D	—	Do
do	—	—	—	T,E	—	—	—	D,F	—	Do
Wicomico	—	—	—	N	—	—	—	N	—	Do
do	39.69[m]	—	10/3/51	J,E	—	—	—	D	63	Water reported hard, irony.
do	58.4	—	10/5/51	C,H	—	—	—	D	—	Water reported slightly irony.
do	73.44[m]	—	10/3/51	T,E	—	—	—	D	—	
do	21.0	—	10/1/51	J,E	—	—	—	D,F	—	Do
Magothy	31	90	7/-/51	J,E	12	7/-/51	0.2	D	—	See driller's log and chemical analysis.
Aquia	50	53	11/-/47	—,E	10	11/-/47	3.3	D	—	See driller's log.
Matawan	19	63	3/-/49	J,E	45	3/-/49	1.0	D	—	Water reported hard, irony. See driller's and sample logs.
do	27	83	6/-/51	J,E	15	6/-/51	.3	D,F	—	Water reported irony. See driller's log.
Wicomico	37.3	—	10/1/51	J,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	T,E	—	—	—	D	—	Do
do	28	—	10/1/51	C,E	—	—	—	D,F	—	Do
do	38.69[m]	—	10/1/51	—	—	—	—	N	—	
Matawan(?)	43	—	10/2/51	C,W	—	—	—	D,F	—	Do
Wicomico	15.3	—	10/2/51	S,E	—	—	—	F	—	Do
do	20.01[m]	—	10/2/51	C,E,W	—	—	—	D,F	—	Do
do	30	—	10/2/51	C,E,W	—	—	—	D,F	—	Do
do	18	—	10/2/51	S,E	—	—	—	D	—	Do
do	25	—	10/2/51	S,H	—	—	—	D	—	Do
do	46.5	—	10/2/51	C,E	—	—	—	D,F	—	Do
do	11.67[m]	—	10/2/51	C,G	—	—	—	D,F	—	Do
do	24	—	10/3/51	J,E	—	—	—	D,F	—	Do
do	38.5	—	10/2/51	J,E	—	—	—	D	—	Do
do	60	—	10/3/51	C,E	—	—	—	D,F	—	Do
do	43	—	10/3/51	J,E	—	—	—	D,F	—	Do
do	23	—	10/3/51	C,E	—	—	—	D,F	—	Do
do	56	—	10/3/51	J,E	—	—	—	D	—	Do
do	25.8	—	10/3/51	J,E	—	—	—	D,F	—	Do
do	30	—	10/3/51	C,E	—	—	—	D,F	—	Do
do	53	—	10/4/51	C,E	—	—	—	D,F	—	Do

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date com-pleted	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bd 25	E. J. Sullivan	—	1900	65	Dug	40	36	—	—
Bd 26	H. D. Oram	—	1850	25	do	30	30	—	—
Bd 27	D. Unruh	—	—	70	do	45	36	—	—
Bd 28	Lester Smith	—	1951	65	Driven	28	2–1½	—	—
Bd 29	—	—	—	60	Dug	33	36	—	—
Bd 30	Brooks	—	1900	65	do	54	36	—	—
Bd 31	Francis Hickman	—	—	50	do	26	30	—	—
Bd 32	J. J. Layken	—	1939	65	Driven	20	1	—	—
Be 1	Arthur Sullivan	Ennis Brothers	1946	60	Drilled	107	4	—	—
Be 2	—	—	—	70	Dug	12	48	—	—
Be 3	W. R. Crow	M. A. Pentz	1938	75	Drilled	158	6	—	—
Be 4	H. Wiltbank	—	—	80	Dug	31	40	—	—
Be 5	Shrewsbury Church	M. A. Pentz	1951	75	Drilled	150	—	—	—
Be 6	H. C. Copper	—	—	70	Dug	30	40	—	—
Be 7	D. Quinn	—	—	60	do	18	40	—	—
Be 8	E. Sutton	—	—	70	do	22	56	—	—
Be 9	Morgan Lusby	—	—	70	do	28	60	—	—
Be 10	—	—	—	65	do	34	48	—	—
Be 11	G. Kennedy	—	—	60	do	28	60	—	—
Be 12	R. E. Hanifee	—	—	70	do	38	72	—	—
Be 13	H. Coleman	—	—	65	do	30	60	—	—
Be 14	Do	—	—	70	do	32	60	—	—
Be 15	E. D. Lusby	—	—	70	do	41	70	—	—
Be 16	B. Wallis	—	—	60	do	30	48	—	—
Be 17	Do	—	—	60	do	24	48	—	—
Be 18	E. L. Fox	—	1790	60	do	32	60	—	—
Be 19	R. Mance	J. N. Unruh	1949	70	Drilled	147	4	139	8
Be 20	C. Williams	M. A. Pentz	1951	50	do	145	4	—	—
Be 21	S. Groves	—	1922	65	Dug	26	76	—	—
Be 22	N. Everett	—	—	55	do	26	48	—	—
Be 23	N. Freeman	—	—	70	do	40	72	—	—
Be 24	H. Harrison	—	—	55	do	42	48	—	—
Be 25	E. Coleman	—	—	55	do	40	48	—	—
Be 26	E. Gustafson	—	1941	65	Drilled	—	12	—	—
Be 27	L. Taylor	—	—	65	Dug	51	40	—	—
Be 28	F. O. Mitchell, Inc.	—	1922	65	do	26	48	—	—
Be 29	Do	M. A. Pentz	1929	65	Drilled	90	3	—	—
Be 30	Do	do	1937	65	do	190	6	—	—
Be 31	Do	—	1943	65	Dug	22	48	—	—
Be 32	J. Fuchs	M. A. Pentz	1952	60	Drilled	105	4	96	8
Be 33	Eliza P. Cochran	Ennis Brothers	1952	65	do	73	4	65	5
Be 34	F. O. Mitchell, Inc.	—	—	65	do	169.5	3	—	—

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Wicomico	35	—	10/4/51	J,E	—	—	—	D,F	—	Water reported good.
do	25	—	10/4/51	S,H	—	—	—	D	—	Water reported irony.
do	38	—	4/-/51	C,W	—	—	—	D,F	—	Water reported good.
do	25	—	9/-/51	J,E	—	—	—	D	—	Do
do	26.2	—	10/4/51	C,H	—	—	—	N	—	
do	47.64[m]	—	10/4/51	J,E	—	—	—	D,F	—	Do
do	21.51[m]	—	10/4/51	J,E	—	—	—	D,F	—	Do
do	13	—	10/1/51	S,E	—	—	—	D	—	Do
Monmouth(?)	25	30	10/-/46	—	30	10/-/46	6.0	D	59	Field test: Fe 0.3 ppm, H 68 ppm, pH 6.3. See driller's log.
Wicomico	—	—	—	C,W	—	—	—	N	—	Well caved.
Monmouth(?)	34	—	1938	J,E	—	—	—	D,F	—	Water reported hard, irony.
Wicomico	24.34[m]	—	10/3/51	C,W	—	—	—	D,F	—	Water reported good.
Monmouth-Matawan	—	—	—	T,E	—	—	—	D	54	See chemical analysis.
Wicomico	24.79[m]	—	10/2/51	J,E	—	—	—	D	—	Water reported medium hard, irony. Low at times.
do	13.3	—	—	J,E	—	—	—	D,F	—	Water reported good.
do	15.23[m]	—	10/21/51	S,H	—	—	—	D	58	
do	23.38[m]	—	10/3/51	J,E	—	—	—	D,F	58	Water reported slightly hard and irony.
do	30.61[m]	—	10/4/51	C,H	—	—	—	N	56.5	
do	26.3	—	10/4/51	T,E	—	—	—	D	—	Water reported slightly irony. Water low, 10/51.
do	32.07[m]	—	10/4/51	T,E	—	—	—	D,F	58	Water reported slightly irony.
do	—	—	—	C,H	—	—	—	F	—	Do
do	27.2	—	—	J,E	—	—	—	D,F	—	Do
do	37.88[m]	—	10/4/51	T,E	—	—	—	D,F	56.5	Do
do	26	—	—	C,E	—	—	—	F	—	Water reported hard, irony.
do	21	—	—	S,H	—	—	—	N	—	Water reported hard, irony. Supply inadequate.
do	28	—	—	C,E	—	—	—	D,F	—	Water reported fairly soft, slightly irony.
Monmouth	36	80	6/-/49	J,E	25	6/-/49	.6	D	59	See driller's log.
do	—	—	—	J,E	—	—	—	D,F	59	
Wicomico	19.76[m]	—	10/4/51	S,E	—	—	—	D,F	59	Water reported slightly irony
do	20.50[m]	—	10/4/51	S,E	—	—	—	D,F	60	Water reported good.
do	33.89[m]	—	10/5/51	J,E	—	—	—	D,F	—	Do
do	35.92[m]	—	10/5/51	J,E	—	—	—	D,F	—	Water reported slightly irony.
do	37±	—	—	J,E	—	—	—	D,F	—	Water reported slightly irony.
—	—	—	—	J,E	—	—	—	D,F	—	Do
Wicomico	47.97[m]	—	10/16/51	J,E	—	—	—	D	56.5	Water reported irony. Low at times.
do	18	—	3/21/52	S,E	—	—	—	D	—	Water reported good.
Monmouth(?)	16	—	3/21/52	J,E	—	—	—	C	—	Used by cannery. Screen used; length unknown.
Monmouth-Matawan	16	40	3/21/52	T,E	150	—	6.3	C	—	Screen used; length unkonwn.
Wicomico	17	—	3/21/52	S,E	—	—	—	C	—	Do
Aquia	26	35	2/-/52	—	20	2/-/52	2.2	D,F	—	See driller's log.
do	33.5	60	4/-/52	—	30	4/-/52	1.1	D	—	Do
Monmouth-Matawan	24.88	—	9/24/56	—	—	—	—	N	—	Used as observation well for pumping test

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bf 1	Julian E. Leager	J. N. Unruh	1949	30	Drilled	105	4	40	0
Bf 2	Norman Riggin	Ennis Brothers	1948	65	do	100	4	—	5
Bf 3	Elmer Jarman	Simons	1943	55	Driven	32	1¼	—	—
Bf 4	Mart Messick	—	—	55	Dug	65	60	—	—
Bf 5	John Hallett	—	—	60	do	28	48	—	—
Bf 6	Do	Ennis Brothers	1948	60	Drilled	129	4	123	5
Bf 7	Winston Thomas	—	1912	65	Dug	12	42	—	—
Bf 8	Gilbert C. Greenway III	—	—	10	do	7	54	—	—
Bf 9	Russell I. Hare	M. A. Pentz	1947	60	Drilled	130	4	68	0
Bf 10	Do	do	1941	60	do	65	4	—	—
Bf 11	Edward R. Walls	do	1947	40	do	65	4	—	0
Bf 12	Do	—	—	40	do	—	3	—	—
Bf 13	Charles Warner	—	1907	25	do	105	3	30	—
Bf 14	B. B. Stevens	—	1907	20	do	102	4	52	—
Bf 15	J. E. Higgman	M. A Pentz, Sr.	1907	20	do	102	4	—	—
Bf 16	H. L. Higgman	do	1907	20	do	99	4	—	—
Bf 17	Middletown Fire Dept.	J. N Unruh	1951	20	do	162	6	33	0
Bf 18	Charles L. Hollet	do	1951	25	do	106	4	45	
Bf 19	E. W. Van Sant	—	—	25	do	88	4	—	—
Bf 20	L Shehan	—	—	55	Dug	30	40	—	—
Bf 21	V. S Atkinson	—	—	65	do	26	—	—	—
Bf 22	—	—	—	60	do	16	36	—	—
Bf 23	W. A. Coleman	—	—	65	do	18	70	—	—
Bf 24	A. B. Schelts	—	—	65	do	25	60	—	—
Bf 25	W. W. Chance	—	—	60	do	30	44	—	—
Bf 26	Dewey Turner	—	—	65	do	23	48	—	—
Bf 27	Norman Clough	—	—	55	do	25	42	—	—
Bf 28	Mrs. F. Jarrell	—	—	80	do	30	42	—	—
Bf 29	Do	Ennis Brothers	1945	80	Drilled	130	—	—	—
Bf 30	A Mark	—	—	80	Dug	22	40	—	—
Bf 31	Rev. H. T. Caldwell	—	—	80	do	21	70	—	—
Bf 32	W. Pippin	—	—	65	do	23	45(?)	—	—
Bf 33	Dudley Everett	—	—	65	do	10	42	—	—
Bf 34	Dick Churay	—	—	70	do	18	48	—	—
Bf 35	R. Churay	—	—	70	do	20	36	—	—
Bf 36	L. Collins	—	—	60	do	23	48	—	—

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Aquia	8	20	7/-/49	J,E	12	7/-/49	1.0	C	57	Supplies store and garage. See driller's log and chemical analysis.
do	27.5	62	5/-/48	J,E	40	5/-/48	1.1	D	—	Water reported very irony. See driller's log.
Wicomico	25	—	1943	S,E	—	—	—	D	—	Water reported good.
do	52	—	1943	N	—	—	—	N	—	
do	20	—	1950	J,E	—	—	—	D,F	—	Water reported slightly hard and irony. Went dry in 1947.
Monmouth	37	—	7/-/48	—	11	7/-/48	—	D	58	See driller's log.
Wicomico	9.75 m	—	9/28/51	C,E	—	—	—	D	62	Went dry in 1949.
do	5.85 m	—	9/28/51	S,E	—	—	—	D	—	Water reported good.
Monmouth-Aquia	40	45(?)	8/21/47	J,E	60	8/21/47	12.0(?)	D,F	57	Field test: Fe 2.0 ppm, H 103 ppm, pH 8.3. Filter. See driller's log and chemical analysis.
Aquia	25.5 m	—	9/28/51	C,E	—	—	—	D,F	—	Water slightly hard.
do	12	—	1947	J,E	—	—	—	D,F	65	
—	31.40 m	—	10/16/51	N	—	—	—	N	57	Abandoned. Pipe in well.
Aquia	4	—	1907	S,E	—	—	—	C	—	Supplies hotel, gas station, and house. Same as well 27, M.G.S. Vol. 10, p. 276.
do	4	—	1907	T,E	—	—	—	D	—	Water very irony, Filter. Same as well 26 M.G.S., Vol. 10, p. 276.
do	4	—	1907	T,E	—	—	—	D	—	Water reported irony. Same as well 28. M.G.S., Vol. 10, p. 276.
do	—	—	1907	S,E	—	—	—	D	—	Water reported irony. Same as well 29. M.G.S., Vol. 10, p. 276.
do	3	25	5/-/51	S(?),—	175	5/-/51	7.9	D,P	56	Static level 3.55 ft. below land surface, 10/16/51. See driller's log.
do	8.5	25	5/-/51	—	50	5/-/51	3.0	D	—	Water level 1.43 ft. below land surface 10/16/51. See driller's log.
do	6.5	—	10/16/51	N	—	—	—	N	—	Water reported irony.
Wicomico	25–26	—	10/16/51	S,E	—	—	—	D,F	—	Water reported hard, irony.
do	—	—	—	J,E	—	—	—	D,F	—	Little water; hard, irony
do	11.83 m	—	10/18/51	J,E	—	—	—	D	60	
do	13.65 m	—	10/18/51	J,E	—	—	—	D,F	60.5	Water reported slightly hard, irony.
do	16.20 m	—	10/18/51	S,E	—	—	—	—	61	Gets low.
do	25.73 m	—	10/18/51	J,E	—	—	—	D,F	58	Water reported fairly soft.
do	20.10 m	—	10/18/51	J,E	—	—	—	D,F	58	Water reported good.
do	22	—	10/18/51	C,W	—	—	—	D	—	Do
do	—	—	—	C,W	—	—	—	N	—	Abandoned. Contaminated.
Aquia(?)	—	—	—	J,E	—	—	—	D,F	64	Field test: Fe tr, H 170 ppm, pH 8.3. Filter.
Wicomico	16.74 m	—	10/19/51	J,E	—	—	—	D,F	58	Water reported slightly irony.
do	17.58 m	—	10/19/51	T,E	—	—	—	D,F	59	Do
do	14.30 m	—	10/19/51	S,H	—	—	—	D,F	60	Water reported hard.
do	7.43 m	—	10/19/51	S,H	—	—	—	D	62	Water reported hard, irony.
do	14.40 m	—	10/19/51	J,E	—	—	—	F	62	Very low, 10/51.
do	18.06 m	—	10/19/51	J,E	—	—	—	D	59	Water reported good.
do	—	—	—	S,E	—	—	—	D	—	Water reported fairly soft.

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bf 37	Louis Price	—	—	60	Dug	12	36	—	—
Bf 38	Ruth Boyer	J. N. Unruh	1951	25	Drilled	55	4	27	—
Bf 39	E. Vansant	do	1952	20	do	85	4	41	—
Bf 40	J. Brinsfield	M. A. Pentz	1952	20	do	130	4	105	0
Bf 41	Mrs. Porter	J. N. Unruh	1951	25	do	86	4	37	—
Bf 42	J. Heaman McCauley	M. A. Pentz	1954	70	do	153	4	142	8
Bg 1	C. Preston Adkins	J. N. Unruh	1951	65	do	140	4	110	—
Bg 2	Voshell	do	1951	60	do	140	4	115	—
Bg 3	Wright Pratt	—	1948	65	do	200	4	—	—
Bg 4	John O'Neil	—	—	65	Dug	26	36	—	—
Bg 5	Charles Wiest	—	1945	60	do	30–35	36	—	—
Bg 6	Do	—	1945	60	do	35	36	—	—
Bg 7	Claude Everett	—	—	50	do	25–30	36	—	—
Bg 8	Frazier Gould	—	1942	60	Driven	10	1½	—	—
Bg 9	Millington Game Refuge	M. A. Pentz	1949	70	Drilled	140	1¼	—	—
Bg 10	Warren Van Culin	—	—	60	Dug	18	36	—	—
Bg 11	Fred Berinche	—	—	60	do	12	36	—	—
Bg 12	A. S. Huselton	—	—	80	do	12	48	—	—
Bg 13	Ervin Jones	—	—	75	do	12	36	—	—
Bg 14	Charles Gumberline	—	—	60	do	13	36	—	—
Bg 15	Catherine Donohue	—	—	73	do	25–28	60	—	—
Bg 16	James Donohue	—	—	65	Dug & Driven	25	48–1½	—	—
Bg 17	W. R. Newman	—	—	65	Dug	—	32	—	—
Bg 18	Clarence Jeffords	—	—	15	do	14	36	—	—
Bg 19	Harbison's Dairy	—	1920	70	Drilled	60	4	—	—
Bg 20	Massey Packing Co.	Ennis Brothers	1941	70	do	87	6	—	—
Bg 21	Do	M. A. Pentz	1920	70	do	99	6	—	—
Bg 22	G. Turner	—	—	60	Dug	17	48	—	—
Bg 23	J. Frey	—	—	65	do	15	48	—	—
Bg 24	David Alexander	—	Before 1930	70	do	25	48	—	—
Bg 25	David Alexander	—	—	70	do	23	54	—	—
Bg 26	Massey Packing Co.	Layne-Atlantic Co.	1952	65	Drilled	198	8	177	15
Bg 27	Do	Shannahan Artesian Well Co.	1955	60	do	205	4–2	196	5
Bg 28	Do	do	1955	65	do	250	4–3	191	5
Ca 1	T. Ringgold Jones	—	1940	27	Driven	35	1½	—	—
Ca 2	Do	—	—	27	Dug	23	48	—	—
Ca 3	Cliff Miller	—	—	20	do	21	38	—	—

—Continued

Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Wicomico	12	—	10/19/51	B,H	—	—	—	D	—	Well almost dry, 10/51.
Aquia	—	25	1/-/51	S,H	20	1/-/51	.8	D	—	Well flows at times. Water irony. See driller's log.
do	7	25	6/-/52	—	35	6/-/52	2.0	D	—	See driller's log.
do	31	40	5/-/52	—	30	5/-/52	3.3	D	—	Do
do	8	30	11/2/51	—	30	11/2/51	1.4	D	—	See driller's and sample logs.
do	36	60	3/1/54	—	30	3/1/54	1.2	F	59	
do	44	60	4/-/51	J,E	20	4/-/51	1.2	D,F	—	See driller's log.
do	38	80	6/-/51	—,E	13	6/-/51	.3	D,F	—	Water reported slightly irony. See driller's log.
do	—	—	—	—,E	—	—	—	D,F	—	Water reported slightly irony.
Wicomico	—	—	—	—,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	S,H	—	—	—	D	—	Do
do	—	—	—	—,E	—	—	—	F	—	Do
do	—	—	—	—,E	—	—	—	D,F	—	Water reported good. Supply in adequate at times.
do	—	—	—	S,H	—	—	—	D,F	—	Water reported good.
Aquia(?)	—	—	—	J,E	—	—	—	D	—	Do
Wicomico	4 m	—	3/18/52	—,E	—	—	—	D,F	—	Supply inadequate in dry seasons
do	3.6 m	—	3/18/52	S,H	—	—	—	D,F	—	Do
do	4.8	—	3/18/52	S,H	—	—	—	D,F	—	Water reported good.
do	—	—	—	B,H	—	—	—	D	—	Do
do	4 to 5	—	2/-/52	—,E	—	—	—	D	—	Do
do	—	—	—	S,H	—	—	—	D	54	Water reported good. See chemical analysis.
do	—	—	—	—,E,W	—	—	—	D,F	—	Driven well inside 20 ft. dug well.
do	—	—	—	S,H	—	—	—	D,F	—	
do	—	—	—	S,H	—	—	—	D	—	Water reported good. Shortage in dry seasons.
do	25	—	1943	T,E	—	—	—	C	57	Two wells 18 ft. apart pumped together.
Aquia	17.5	60	—	J,E	60	11/27/55	—	N	—	Screen used; length unknown
do	30	—	3/21/52	J,E	—	—	—	C	—	Used by cannery. Water reported irony. See temperature log.
Wicomico	11.0 m	—	3/21/52	T,E	—	—	—	D,F	—	Water reported good.
do	3.80 m	—	3/21/52	J,E	—	—	—	D,F	—	Water reported good. Dry in 1950.
do	14.11 m	—	3/21/52	T,E(?)	—	—	—	D	—	Water reported good.
do	11.8	—	3/21/52	S,E	—	—	—	F	—	Water reported good.
Monmouth	18	65	6/-/52	T,E	200	6/-/52	4.3	C	—	Cannery. See driller's log.
do	15	44	11/2/55	N	10	11/2/55	.4	N	—	Test hole. Plug from 201 to 205 ft. Observation well. See driller's log and temperature log.
do	23	48	11/5/55	N	15	11/5/55	.6	N	—	Test hole. Plug from 196 to 250 ft. See driller's log and temperature log.
Talbot	—	—	—	S,E	—	—	—	D,F	—	Water reported irony.
do	16.32 m	—	3/20/52	C,W	—	—	—	F	—	Water reported good.
do	17.67 m	—	3/20/52	C,W	—	—	—	D,F	—	Do

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ca 4	Thomas N. Page	—	—	16	Dug	25	40	—	—
Cb 1	Willard Kinsey	Ennis Brothers	1950	60	Drilled	75	4	70.8	5
Cb 2	Robert N. Francis	J. N. Unruh	1951	40	do	70	4	66	4
Cb 3	John Huntington	—	—	20	Driven	32	1¼	—	—
Cb 4	Do	M. A. Pentz	1947	20	Drilled	148	4	—	—
Cb 5	Brown-Entrekin	do	1946	20	do	120	4	—	—
Cb 6	Do	—	1941	20	Dug	27	72	26.5(?)	—
Cb 7	Do	—	—	20	do	25	36	—	—
Cb 8	Walter Watson	—	1951	20	do	35	44	—	—
Cb 9	W. C. Atkinson	—	—	40	do	38	48	—	—
Cb 10	Tolchester Hotel	—	—	10	Driven	30–40	2	—	—
Cb 11	Clifton M. Miller	Shannahan Artesian Well Co.	1931	20	Drilled	165	—	—	—
Cb 12	Do	—	1940	20	Driven	33	1¼	—	—
Cb 13	Geneva Kmiec	—	—	28	Dug	11	40	—	—
Cb 14	Charles H. Skirven	—	1902	60	do	22	36	—	—
Cb 15	Alverta Nicholson	—	—	40	do	20	—	—	—
Cb 16	W. R. MacCubbin	—	—	20	do	14	40	—	—
Cb 17	R. L. Embree	—	—	20	do	18	—	—	—
Cb 18	Severn Miller	—	1951	20	Driven	35–40	1½	—	—
Cb 19	Mrs. Otto Lassen	—	—	20	Dug	13–15	—	—	—
Cb 20	Ida C. Loller	—	—	60	do	40	40	—	—
Cb 21	James Stavely	Ennis Brothers	1951	60	Drilled	124	4	—	—
Cb 22	Carroll Cliff	do	1951	60	do	103	4	89.6	5
Cb 23	Dr. J. R. Kitchell	do	1951	20	do	117	4	111.6	5
Cb 24	Tulip Forest Farm	M. A. Pentz	1944	65	do	90	4	—	—
Cb 25	Tulip Forest Farm	—	—	70	Dug	42	40	—	—
Cb 26	Rudolf Voegler	Ennis Brothers	1951	25	Drilled	117	4	111	5
Cb 27	Glenn L. Martin	—	—	20	Dug	21	40	—	—
Cb 28	Do	—	—	35	do	20	30	—	—
Cb 29	Do	—	—	25	do	21±	40	—	—
Cb 30	R. B Gundensen	Ennis Brothers	1953	35	Drilled	102	4	94.7	5
Cb 31	U. S. Army	S. V. Shannahan	1955	30	do	48	6	34	10
Cb 32	Do	do	1955	30	do	66	6	35	10
Cc 1	Charles Wilson	Ennis Brothers	1949	65	do	170	4	163.5	5
Cc 2	Howard B. Strong	—	—	25	Dug	21	48	—	—
Cc 3	Quenton Dulin	—	1941	60	do	42	—	—	—
Cc 4	Harry Massey	—	—	80	do	40	48(?)	—	—
Cc 5	Sutton Tarbutton	—	—	80	do	40	48	—	—

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Talbot	20.86[m]	—	3/20/52	S,E	—	—	—	D,F	—	Water reported fair.
Monmouth	41	69	8/–/50	J,E	20	8/–/50	.7	D	—	Water reported good. See driller's log.
Wicomico	34.5	40	2/–/51	J,E	20	2/–/51	3.6	D	—	Do
Talbot(?)	25.77[m]	—	3/17/52	J,E	—	—	—	D	—	Water reported irony.
Raritan(?)	—	—	—	J,E	—	—	—	D	—	Screen used; length unknown.
Raritan	—	—	—	J,E	—	—	—	F	—	Water reported iony. Screen used; length unknown.
Talbot	16.36[m]	—	3/17/52	S,G	—	—	—	D	—	Water bad, irony. May have 1¼-inch drive point inside.
do	—	—	—	S,E	—	—	—	D	—	Water poor.
do	34.50[m]	—	3/17/52	—,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	S,G	—	—	—	D,F	—	Do
do	—	—	—	S,E	—	—	—	C	—	Water reported fair. Use about 24,000 gpd.
Raritan(?)	—	—	—	T,E	—	—	—	N	—	Water very irony. Drilled to 400 feet and plugged back to 165 feet.
Talbot	—	—	—	S,E	—	—	—	D,F	—	Water reported slightly acid.
do	3.25[m]	—	3/18/52	S,E	—	—	—	D,F	—	Water reported good.
Wicomico	15.42[m]	—	3/18/52	S,E	—	—	—	D,F	—	Do
Talbot	—	—	—	S,E	—	—	—	D,F	—	Do
do	—	—	—	S,E	—	—	—	D,F	—	Water reported hard.
do	—	—	—	S,H	—	—	—	D	—	Water reported good.
do	—	—	—	S,E	—	—	—	D,F	—	Approx. 1,250 gpd used.
do	—	—	—	S,E	—	—	—	D,F	—	Water reported good.
Wicomico	—	—	—	J,E	—	—	—	D	—	Do
Matawan(?)	56.1	—	6/13/51	—,E	—	—	—	D	61	Field test: Fe 8.0 ppm, H 34 ppm, pH 7.0
Matawan	56.1	80	6/13/51	—,E	8	6/13/51	.3	D	—	Water very poor, irony. See driller's log.
Magothy	33.7	60	5/25/51	J,E	40	5/25/51	1.5	D	—	Water reported good. See driller's log.
Magothy(?)	—	—	—	J,E	—	—	—	F	59	Field test: Fe 10 ppm, H 17 ppm, pH 7.
Wicomico	32.9[m]	—	3/19/52	C,W	—	—	—	D,F	51	Water reported hard
Monmouth	31.9	60	6/1/51	—	35	6/1/51	1.2	D,F	—	
Talbot	—	—	—	—	—	—	—	—	—	Water reported good.
do	13.2	—	3/20/52	J,E	—	—	—	D,F	—	Do
do	—	—	—	S,E	—	—	—	D	—	
Magothy	34	63	5/–/53	—	30	5/–/53	1.0	D	—	See driller's log.
Talbot	14.5	18.5	4/–/55	N	40	4/–/55	10.0	P	—	See driller's log and chemical analysis.
do	27	32	4/–/55	N	30	4/–/55	6.0	P	—	Plugged back to 45 ft. See driller's log and chemical analysis
Monmouth	44	84	2/–/49	—	30	2/–/49	.7	N	—	Field test: Fe 7.5 ppm, H 68 ppm, pH 8. See driller's log.
Talbot	12.23[m]	—	3/18/52	S,E	—	—	—	D,F	—	
Wicomico	39	—	3/–/49	J,E	—	—	—	D,F	—	
do	—	—	—	C,W	—	—	—	D,F	—	Water reported slightly irony.
do	—	—	—	S,E	—	—	—	D,F	—	

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Cc 6	C. L. Willis	—	—	80	Dug	23	48	—	—
Cc 7	Solomon Walbert	—	—	50	do	22	48	—	—
Cc 8	C. S. Lecates	—	—	60	do	32	48	—	—
Cc 9	W. B. Langdon	—	—	65	do	43	48	—	—
Cc 10	Walter Walbert	—	1865	60	do	40	48	—	—
Cc 11	Charles Hawkins	—	—	60	do	50(?)	48(?)	—	—
Cc 12	Mrs. Lulu Massey	—	1926	70	do	39	48	—	—
Cc 13	Kent Concrete Co.	Ennis Brothers	1949	30	Drilled	—	3	—	—
Cc 14	E. E. Gustafson	—	—	40	Dug	26	72	—	—
Cc 15	W. Franklin Moffett	—	—	25	do	31	48	—	—
Cc 16	R. R. Walbert	—	—	25	do	12	40	—	—
Cc 17	M. B Johnson	—	—	20	do	20	48	—	—
Cc 18	Thom. Claison	—	—	60	do	40(?)	48	—	—
Cc 19	W. R. Rusk	—	—	40	do	40	48	—	—
Cc 20	H. W. Hadiway	—	—	55	do	40	48	—	—
Cc 21	Brice Moore, Jr.	—	—	60	Drilled	100(?)	4	—	—
Cc 22	Kent Price	—	—	60	Dug	40	48	—	—
Cc 23	E. R Morris	—	1850	55	do	15	40	—	—
Cc 24	George F. Sparks	—	—	70	do	18	48	—	—
Cc 25	J. Nicols	—	—	65	Dug	26	48	—	—
Cc 26	Albert T. Nicholson	—	—	80	do	22	48	—	—
Cc 27	Kent S. Price	M. A. Pentz	1955	63	Drilled	161	4	106	—
Cd 1	W. Cranshaw	M. A. Pentz	1951	65	do	120	4	110	5
Cd 2	Chestertown Water Board	Shannahan Artesian Well Co.	1946	15	do	82	20–14	—	27.7
Cd 3	Do	J. H. K. Shannahan	1909	15	do	1135	8	—	—
Cd 4	Robert Schauber	M. A. Pentz	1949	60	do	72	4	62	8
Cd 5	F. Gibson	O. McGinnis	1947	70	do	130	—	—	—
Cd 6	R. L. Davis	Ennis Brothers	1949	65	do	72	4	66	—
Cd 7	Charles W. Slagle	do	1949	65	do	76	4	66	5
Cd 8	L. W. Graves	J. N. Unruh	1949	25	do	81	4	73	8
Cd 9	Do	do	1951	65	do	127	4	112	—
Cd 10	Brian Kane	do	1951	10	do	27	4	23	4
Cd 11	Usilton	do	1951	30	do	70	4	62	8
Cd 12	Roe	do	1951	12	do	27	4	23	4
Cd 13	F. R. Albrecht	do	1951	20	do	166	4	158	8
Cd 14	Edward Harris	do	1950	35	do	63	4	55	8
Cd 15	Jewell Brothers Garage	do	1950	60	do	140	4	133	8
Cd 16	Ed Vansant	do	1951	60	do	82	4	74	8
Cd 17	Bradford Schauber	—	1948	20	Dug	25	61	—	—

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Wicomico	12.22^{m}	—	3/18/52	—,E	—	—	—	D,F	—	Water reported good.
do	14.74^{m}	—	3/18/52	J,E	—	—	—	D,F	—	Pumps dry in 4 hours.
do	26.14^{m}	—	3/19/52	C,E	—	—	—	D	—	
do	40.70^{m}	—	3/19/52	C,E	—	—	—	D,F	—	
do	—	—	—	J,E	—	—	—	D,F	—	Water slightly irony and hard
do	—	—	—	C,E	—	—	—	D,F	—	Water reported slightly irony.
do	29	—	3/19/52	J,E	—	—	—	D,F	—	
—	—	—	—	J,E	—	—	—	C	—	Water reported irony.
Talbot	20	—	—	S,E	—	—	—	D,F	—	Water reported slightly irony.
do	26.15^{m}	—	3/20/52	S,E	—	—	—	D,F	—	
do	3.50^{m}	—	3/20/52	S,E	—	—	—	D,F	—	
do	—	—	—	S,H	—	—	—	D	—	
Wicomico	—	—	—	S, G	—	—	—	D,F	—	Water reported hard.
do	—	—	—	J,E	—	—	—	D	—	Water reported hard, irony.
do	36	—	1945	J,E	—	—	—	D	—	Water reported hard.
—	—	—	—	S,E	—	—	—	D	—	Water reported hard, slightly irony. Concrete casing to 12 ft. depth.
Wicomico	—	—	—	J,E	—	—	—	D,F	—	Runs dry if pumped too long.
do	11	—	—	S,E	—	—	—	D	—	Went dry 1933; deepened. Water reported irony.
do	2.52	—	3/20/52	S,E	—	—	—	D,F	—	
do	19	—	—	—,G	—	—	—	D,F	—	
do	16	—	—	J,E	—	—	—	D,F	—	Water reported hard, slightly irony.
Aquia	51	60	5/31/55	C,E	15	5/31/55	1.7	D,F	—	See driller's log.
do	54	63	4/4/51	J,E	10	—	1.1	D	—	See driller's log.
Aquia-Talbot	17	66	11/15/46	T,E	250	11/15/46	5.1	P	—	See driller's log and chemical analysis.
—	—	—	—	N	50	1909	—	N	—	Reported Fe 14.2 ppm, H 205 ppm, Cl 578 ppm. Abandoned. Well flowed 2 gpm. See driller's log.
Aquia	39	46	12/-/49	J,E	10	—	1.4	D	—	Water reported good. See driller's log.
—	—	—	—	—,E	—	—	—	D	—	Water reported slightly irony.
Aquia	49.5	70	3/-/49	J,E	20	3/-/49	1.0	D	—	Screen used, length unknown. See driller's and sample logs.
do	47.4	68	6/-/49	—,E	17	6/-/49	.8	F	—	Water reported good.
do	25	60	9/-/49	—	6	1949	.1	D	60	
do	60.5	80	3/-/51	J,E	20	3/-/51	1.0	D	57	
do	3	20	7/-/51	—	25	7/-/51	1.5	D	—	Water reported slightly irony.
do	30	55	7/-/51	J,E	10	7/-/51	.4	D	—	Do
do	8.5	25	7/-/51	J,E	20	7/-/51	1.2	D	—	See driller's log.
Monmouth	22	80	9/-/51	J,E	15	9/-/51	.3	D	—	Water reported irony. Field test: Fe 2.0 ppm, H 120 ppm, pH 10.4. See driller's and sample logs
Aquia	30.5	53	7/-/50	—,E	10	7/-/50	.4	D	63	See driller's log.
do	40	60	8/-/50	J,E	20	8/-/50	1.0	C	58	See driller's log and chemical analysis.
do	47	68	7/-/51	J,E	10	7/-/51	.5	D	—	Water reported good. See driller's log.
Talbot	20.95^{m}	—	3/20/52	J,E	—	—	—	D,F	—	Water reported good.

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Cd 18	Bradford Schauber	—	1952	20	Dug	21	54	—	—
Cd 19	Mrs. H. S. Brown	—	1925	5	Drilled	—	6	—	—
Cd 20	W. J. Masdin	—	1930	20	Dug	26	—	—	—
Cd 21	Vita Food Products, Inc.	Ennis Brothers	1944	40	Drilled	128	8	—	20
Cd 22	Koontz Dairy	J. N. Unruh	1947	60	do	140	4	—	8
Cd 23	Baldwin	F. R. Kielkopf	1953	15	do	95	4	76.5	8
Cd 24	W. Cranshaw	M. A. Pentz	1952	60	do	87	4	80	7(?)
Cd 25	Tull	F. R Kielkopf	1952	15	do	66	4	58	8
Cd 26	Reade Cooz	do	1952	15	do	85	4	77	8
Cd 27	Coleman	J. N. Unruh	1953	20	do	70	4	66	4
Cd 28	Albert Sutton	F. R. Kielkopf	1952	60	do	75	4	66	8
Cd 29	A. A. Brown	J. N. Unruh	1953	30	do	83	4	75	4
Cd 30	Nicholson	do	1954	50	do	80	4	—	—
Cd 31	Noble Hardesty	M. A. Pentz	1954	25	do	100	4	74	0
Cd 32	Vita Food Products, Inc.	S. V Shannahan	1954	42	do	143	12	96	—
Cd 33	Chestertown Water Board	Shannahan Artesian Well Co.	1953	16	do	95	20–12	50	15
Cd 34	Vita Food Products, Inc.	S V Shannahan	1956	40	do	132	12–8–4	See remarks	
Cd 35	Chestertown Yacht and Country Club	do	1955	8	do	86	6	76	10
Cd 36	Lamotte Chem. Prod. Co.	Ennis Brothers	1956	65	do	253	4–3	238	15
Cd 37	Chestertown Water Board	Shannahan Artesian Well Co.	1934	8	do	83	12	—	—
Cd 38	Do	do	1937	8	do	81	12	—	—
Cd 39	Do	—	Before 1909	15	do	583	8	—	—
Cd 40	Do	Kelly Well Co	1930	8	Dug	77	24	35	41
Cd 41	Do	do	1930	4	do	67	24	31	35
Ce 1	C. C. Jenkins	—	1940	25	do	70	48(?)	—	—
Ce 2	Do	—	—	10	Spring	—	—	—	—
Ce 3	F. W. Stevens	—	1949	30	Dug	30	40	—	—
Da 1	Edgar M. Lucas	—	1916	10	do	20	40	—	—
Da 2	Do	—	1916	10	do	20	40	—	—
Db 1	Town of Rock Hall	Ennis Brothers	1946	15	do	120	6	—	—
Db 2	Ivens Hudson Oyster Co.	do	1946	8	do	202	6	—	—
Db 3	Kent Packing Co.	Shannahan Artesian Well Co.	1948	15	do	128	8	107	21

—*Continued*

Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Talbot	16.85 m	—	3/21/52	J,E	—	—	—	F	—	Water reported good.
—	—	—	—	S,E	—	—	—	D	—	Do
Talbot	17	—	3/21/52	S,E	—	—	—	D	—	Do
Aquia	26.65 m	—	3/20/52	T,E	170	—	—	C	57.5	Used by packing house. See driller's log.
do	—	—	—	J,E	10	1947	—	C	—	Water reported good.
do	—	—	—	—	15	—	—	D	—	Water reported good. See driller's and sample logs.
do	37	43	5/-/52	—	10	5/-/52	1.7	D	—	See driller's log.
do	5	40	9/-/52	—	30	9/-/52	.9	D	—	Water reported good. See driller's log.
do	9	63	9/-/52	—	20	9/-/52	.4	D	—	See driller's log
do	16	40	1/-/53	—	20	1/-/53	.9	D	—	Do
do	38	63	5/-/52	—	10	5/-/52	.4	D	—	Do
do	28	65	9/7/53	—	12	9/7/53	.3	D	67	Field test: Fe 0.5 ppm, H 68 ppm, pH 7.3. See sample log.
do	—	—	—	—	—	—	—	C	61	Store. Field test: Fe 0.6 ppm, H 34 ppm, pH 6.5.
do	13	26	4/21/54	—	100(?)	4/21/54	7.6(?)	D	—	See driller's log.
do	28.94 m	—	4/4/55	T,E	275	4/4/55	—	C	57	Packing house. Plug in bottom of screen at 96 feet. See driller's log.
Aquia-Talbot(?)	21	73	3/24/53	T,E	215	3/24/53	4.1	P	—	See driller's log and chemical analysis.
do	25	70	5/20/56	T,E	275	5/20/56	6.1	C	—	Screens at 74–84 ft. and 108–129 ft. See driller's log.
do	3	20	6/24/55	T,E	120	6/24/55	7.0	P	—	Used for swimming pool.
Monmouth(?)	47	84	3/22/56	T,E	40	8/22/56	1.1	C	—	
Aquia-Talbot(?)	—	—	—	T,E	230	1934	—	P	—	See chemical analysis.
do	7	—	-/-/37	T,E	190	1937	—	P	—	Do
Raritan(?)	—	—	—	—	100	Before 1909	—	N	—	Fe + 2 ppm. Abandoned. Well flowed 20 gpm.
Aquia-Talbot(?)	11	52	1930	—	230	1930	5.6	N	—	Abandoned. See driller's log.
do	3	46	1930	—	210	1930	5.2	N	—	Do
Talbot	—	—	—	C,W	—	—	—	F	—	Water reported very irony.
do	—	—	—	S,E	4–12	—	—	D	58	Supplies three houses. In use 7 years. Cement box.
do	18(?)	—	4/-/49	J,E	—	—	—	D	—	Water reported good.
do	11.69 m	—	3/20/52	C,W	—	—	—	F	—	Water reported good.
do	—	—	—	S,E	—	—	—	D	—	Use approx. 600 gpd
Matawan	21	40	5/-/46	T,E	180	5/-/46	9.5	P	—	Water very irony. See driller's and sample logs, and analyses.
Magothy	6	60	5/-/46	N	85	5/-/46	1.6	N	—	Water very bad. Abandoned. Screen used, length unknown. See driller's and sample logs
Monmouth	13	65	7/-/48	T,E	165	7/-/48	3.2	C	—	Cannery. Water very irony. See driller's log.

TABLE 46

Well Number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Db 4	Dr. Ludwig	J. W. Wilson and Sons	1947	10	do	118	2½	100	0
Db 5	Sharpstown School	J. N. Unruh	1950	25	do	96	4	88	8
Db 6	Wm. L. Leary	—	1950	18	Dug	12	38	—	—
Db 7	Gulf Station (J. Jacguette)	—	1946	19	do	11	38	—	—
Db 8	J. Jacguette	S. Elburn	1951	19	Driven	12	1½	—	—
Db 9	C. R. Jones	do	1951	15	Dug	8	38	—	—
Db 10	Do	—	—	15	Driven	15	1¼	—	—
Db 11	R. Jacquette	—	1950	20	do	12	1½	—	—
Db 12	Jesse Downey	—	1928	20	Dug	12	72	—	—
Db 13	Dr. H. V. P. Wilson	J. N. Unruh	1949	15	Drilled	260	4	219	—
Db 14	Lloyd Cross	F. R. Kielkopf	1952	20	do	126	4	118	8
Db 15	Capt Malberg	J. N. Unruh	1951	10	do	139	4	131	8
Db 16	Mrs. Brooks	do	1951	10	do	137	4	129	8
Db 17	G. E. Leary	do	1951	10	do	148	4	140	8
Db 18	H. W. Young	do	1951	10	do	70	4	66	4
Db 19	C. Ruth Jones	do	1951	18	do	130	4	122	8
Db 20	G. Collins	—	1950	20	Dug	23	42	—	—
Db 21	F. Baker	—	1940	15	do	17	36	—	—
Db 22	L. T. Hyland	—	1910	18	do	11	48	—	—
Db 23	W. F. Hill	—	1890	12	do	13	36	—	—
Db 24	Daisy Edwards	—	—	20	Drilled	—	—	—	—
Db 25	Tom Edwards	—	—	15	Dug	18.1	40	—	—
Db 26	W. T Hudson	—	1943	15	Drilled	70	4	—	—
Db 27	A. Ashley	—	1918	20	Dug	25	—	—	—
Db 28	Do	—	—	20	do	25	36	—	—
Db 29	J. H Smithson	—	1948	15	Driven	18	1¼	—	—
Db 30	C. E. Godley	—	—	5	do	—	1¼	—	—
Db 31	C Wesley	—	1945	25	Dug	14	42	—	—
Db 32	C. J. Nuttall	—	—	10	do	18	36	—	—
Db 33	C. Sisco	—	—	20	do	11	30	—	—
Db 34	L. Ledg	F. R. Kielkopf	1953	20	Drilled	160	4	—	—
Db 35	Town of Rock Hall	Ennis Brothers	1953	15	do	290	8	272	19
Db 36	Kent Packing Co.	—	—	15	do	106	6(?)	—	—

—Continued

Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Monmouth	7	12	4/–/47	T,E	40	4/–/47	8.0	D	—	Water reported irony. See driller's log.
do	18	70	7/20/50	S,E	15	7/20/50	.3	S	—	Water very irony. See driller's log.
Talbot	9.80[m]	—	10/16/51	S,E	—	—	—	D	—	Water poor. Gets low.
do	6.51[m]	—	10/15/51	S,E	—	—	—	C	64	Water reported good.
do	4	—	5/15/51	S,E	—	—	—	D	—	Water reported good. Screen used; length unknown.
do	4.57[m]	—	10/15/51	J,E	—	—	—	D	—	Swampy odor
do	4.78[m]	—	10/15/51	S,H	—	—	—	D	—	Water reported poor, swampy odor, irony.
do	—	—	—	J,E	—	—	—	D	—	Water irony, swampy. Screen used; length unknown.
do	8.99[m]	—	10/15/51	S,E	—	—	—	D	—	Brick-lined. Water irony, swampy.
Matawan	13.8	40	7/–/49	—	7.5	7/–/49	.2	D	—	See driller's log.
Monmouth	12	25	10/–/52	—,E	30	10/–/52	2.3	D	—	Water reported irony.
do	2	60	3/–/51	S,E	24	3/–/51	.4	D	—	Water reported irony. Filter. See, driller's log.
do	5	60	3/–/51	S,E	25	3/–/51	.4	D,F	60	Field test: Fe 9.0 ppm, H 34 ppm, pH 7.5. See driller's log.
do	7	60	4/–/51	S,E	30	4/–/51	.6	N	56.5	Field test: Fe 3.0 ppm, H 17 ppm, pH 7. Dug well on same property: Fe 17.0 ppm, H 187 ppm, pH 7.5. See driller's log.
do	1	25	8/–/51	—,E	50	8/–/51	2.0	D	—	Water reported very irony. See driller's log.
Matawan	6	80	11/20/51	J,E	25	11/20/51	.3	D	—	Do
Talbot	19.11[m]	—	3/20/52	S,E	—	—	—	D,F	—	Water reported very irony.
do	10.15[m]	—	3/20/52	S,E	—	—	—	D	—	Water reported good.
do	3(?)	—	3/20/52	S,H	—	—	—	D	—	Water reported good. Went dry once.
do	1.56[m]	—	3/21/52	J,E	—	—	—	D	—	Water reported slightly hard. Low at times.
—	—	—	—	S,E	—	—	—	D	—	Water reported good.
Talbot	8.91[m]	—	3/2/52	S,E	—	—	—	D	—	
Aquia(?)	—	—	—	S,E	—	—	—	C(?)	—	Oyster house. Water slightly irony. Screen used; length unknown.
Talbot	21	—	3/21/52	N	—	—	—	D	—	Water reported slightly irony. Stand-by well.
do	21	—	3/21/52	S,E	—	—	—	D	—	Water reported slightly irony.
do	—	—	—	S,E	—	—	—	D	—	
do	—	—	—	S,H	—	—	—	D	—	Do
do	4.06[m]	—	3/21/52	B,H	—	—	—	D	—	Water reported good.
do	11.77[m]	—	3/21/52	T,E	—		—	D	—	Water reported irony. Filter.
do	1.03[m]	—	3/21/52	B,H	—	—	—	D	—	Water reported good. Small supply.
Matawan(?)	12.5	—	8/13/53	—	—	—	—	D	—	See driller's and sample logs.
Raritan	11	109	9/26/53	T,E	105	—	1.1	P	—	See driller's log and chemical analysis.
Monmouth	10.99[m]	—	6/25/52	—	—	—	—	N	—	Used as observation well for pumping test. 52 feet north of Db 3.

TABLE 46

Well number (Ken-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Dc 1	Catherine Overbeck	Shannahan Artesian Well Co.	1946	9	do	87	6	48	0
Dc 2	Herbert Fletcher	M. A. Pentz	1949	15	do	80	4	70	8
Dc 3	R. D. Wilson	J. N. Unruh	1949	20	do	78	4	70	8
Dc 4	Mrs. Wm. Crowey	—	—	30	Dug	22	42	—	—
Dc 5	Mrs. Ruth Lucht	—	—	30	do	60	42	—	—
Dc 6	Susie A. Johnson	—	—	20	do	30	48	—	—
Dc 7	Mrs. C. R. Humphreys	—	—	15	do	30	42	—	—
Dc 8	G. M. Maddux	—	1951	8	Driven	17	2	—	—
Dc 9	Carl L. Brown	—	1951	15	Dug	12(?)	48	—	—
Dc 10	Mr Gildersleeve	—	—	20	do	—	48	—	—
Dc 11	Mrs. G. L. Watson	—	1934	15	Drilled	280	3	—	—
Dc 12	Wm. Barnes	—	—	15	Dug	19	42	—	—
Dc 13	Higgins	F. R. Kielhopf	1953	15	Drilled	62	4	54	—
Dc 14	Mrs. R. Anderson	do	1953	10	do	157	4	119	—
Dc 15	Mabon Kingsley	—	1937	20	Dug & Driven	35–40	36–1¼	—	—
Dc 16	Edward Hurd	—	1935	20	Dug	23	40	—	—
Dc 17	Bartus Trew	—	—	15	do	20	—	—	—
Dc 18	Do	—	1951	15	do	21	40	—	—
Dc 19	Do	—	1951	15	do	16	40	—	—
Dc 20	B. E. Wallace	—	—	25	do	21	32	—	—
Dc 21	Wm. R McAlbin	Stodoff(?)	1937	16	Drilled	89	6	—	—
Dc 22	Chas. W. Kirby	—	1941	18	Driven	35	1¼	—	—
Dc 23	Peter Jopling	—	1912	15	Dug	19	28	—	—
Dd 1	W. D Hines	—	—	20	do	26	—	—	—
Eb 1	Boxes Point Farm	Ennis Brothers	1945	10	Drilled	102	4	—	10
Eb 2	H. Esenwein	—	—	20	Dug	17	36	—	—
Eb 3	B. White	—	—	20	Spring	—	—	—	—
Eb 4	A. Waterfield	—	1923	3	Drilled	317	—	—	—
Eb 5	J. E. Willson	—	—	10	Dug	12	36	—	—
Eb 6	P. Aello	—	—	10	do	20	36	—	—

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Water bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Aquia	9	15	11/-/46	J,E	40	11/-/46	6.7	D	—	Observation well. See driller's log.
do	30	38	7/-/49	J,E	10	7/-/49	1.2	D	—	See driller's log.
do	25	60	7/-/49	—	20	7/-/49	.6	D	—	See driller's and sample logs.
Talbot	—	—	—	J,E	—	—	—	C	—	Water reported good.
do	—	—	—	—,E	—	—	—	D	—	Do
do	6	—	3/20/52	—,E	—	—	—	D	—	Do
do	—	—	—	—,E	—	—	—	D	—	Water reported hard.
do	—	—	—	—,E	—	—	—	D	—	Water reported good.
do	—	—	—	S,H	—	—	—	D	—	Do
do	—	—	—	S,H,E	—	—	—	D,F	—	Do
Monmouth	—	—	—	S,W	—	—	—	D,F	—	Water reported very hard.
Talbot	—	—	—	B,H	—	—	—	D	—	Water reported good.
Aquia	15.5	27	7/-/53	—	10	7/-/53	.9	D	—	Water reported slightly irony. Could not use screen. Second well drilled to 51 ft. See driller's log.
do(?)	9	—	7/-/53	—	50	7/-/53	—	N	—	Water reported salty. See driller's log.
Talbot	—	—	—	S,E	—	—	—	D	—	Water reported good.
do	16.28[m]	—	3/21/52	—,E	—	—	—	D,F	—	Use approx. 800 gpd.
do	—	—	—	S,E	—	—	—	D,F	—	Water reported good.
do	6.04[m]	—	3/21/52	N	—	—	—	N	—	Contaminated.
do	7.0[m]	—	3/21/52	S,E	—	—	—	D,F	—	Water reported good. Use approx. 1,000 gpd.
do	11.7[m]	—	3/21/52	S,E	—	—	—	D,F	—	Do
Aquia(?)	—	—	—	S,E	—	—	—	D,F	—	Screen used: length unknown. Use approx. 10,000 gpd.
Talbot	—	—	—	S,H	—	—	—	D	—	Use approx. 200 gpd.
do	12.57[m]	—	3/21/52	S,E	—	—	—	D,F	—	Water reported clear, soft.
Talbot	—	—	—	—	—	—	—	D,F	—	Water reported good
Aquia	12	60	10/-/45	J,E	25	10/-/45	.5	D	—	Water reported slightly hard. See sample log.
Talbot	3.20[m]	—	3/20/52	N	—	—	—	N	—	Water reported brackish.
do	—	—	—	S,E	—	—	—	—	—	Water reported irony. Never goes dry.
Monmouth(?)	—	—	—	S,E	—	—	—	D	—	Water reported slightly irony.
Talbot	5.35[m]	—	3/20/52	S,E	—	—	—	D,F	—	Do
do	6.02[m]	—	3/20/52	S,H	—	—	—	D,F	—	Water reported irony.

TABLE

Records of Wells in Queen

Water level: Measured water levels are designated by "m".
Pumping equipment: Method of lift: B, bucket; C, cylinder; J, jet; N, none; NI, pump to be installed; S, suction; T, tur
Type of power· E, electricity; G, gasoline; H, hand, W, wind
Use of water: C, commercial; D, domestic; F, farm; N, not used; P, public supply S, school.
Remarks: Chemical analyses referred to are in Table 44.
Well logs referred to are in Tables 50 and 53.

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ag 1	Eastern Shore Dehydrating and Processing Corp.	M. A. Pentz(?)	1947	50	Drilled	67	4	—	—
Ag 2	James Teat	F. R. Kielkopf	1951	20	do	78	4	78	—
Ag 3	E. S. Atkinson	J. N. Unruh	1950	15	do	56	4	43	—
Ag 4	Harry Wisner	M. A Pentz	1947	41	do	67	4	63	—
Be 1	Md. State Roads Commission	—	—	19	Driven	21	$1\frac{1}{4}$	—	—
Be 2	Carroll Baxter	Wm. Aaron	1952	44	Drilled	190	—	—	—
Be 3	Beauford East	Middletown Well Drlg. Co.	1951	42	do	91	4	83	8
Be 4	B. H. Bloomgarden	J. N. Unruh	1952	40	do	86	4	78	8
Be 5	Edward R. Elburn	Ennis Brothers	1951	15	do	45	4	40.5	5
Be 6	W. B. Williamson	M. A. Pentz	1953	10	do	47	4	41	5
Be 7	Wm. Coles	—	1940	60	do	91	4	91	0
Be 8	Edwin Leverage	—	1933	54	Dug	25	60	—	—
Be 9	Joe Nadolny	—	1893	57	do	57	54	—	—
Be 10	Mrs. F. Leach	—	—	19	Driven	14	$1\frac{1}{2}$	14	—
Be 11	Chino Farms	—	1946	30	Drilled	150	$3\frac{1}{2}$	150	0
Be 12	N. R. Quesenberry	—	1900	60	Dug	37	54	—	—
Be 13	Bonwill Farm	J. N. Unruh	1953	50	Drilled	64(?)	4	—	—
Be 14	E. M. Bonwill	do	1953	50	do	67	4	—	—
Bf 1	Wilford Holden	Ennis Brothers	1948	60	do	84	4	—	—
Bf 2	C. W. Thornton	M. A. Pentz	1948	28	do	55	4	50	5
Bf 3	Do	N. Hardesty	—	28	Driven	28	$1\frac{1}{2}$	—	—
Bf 4	Do	do	—	28	do	38	$1\frac{1}{2}$	—	—
Bf 5	Chino Farms	M. A. Pentz	1948	29	Drilled	120	4	97	10
Bf 6	M. A. Markley, Inc.	do	1952	60	do	106	4	76	0
Bf 7	Chino Farms	do	1948	80	do	140	4	87	—
Bf 8	Thomas Dodd	—	1900	70	Dug	30	48	—	—
Bf 9	C. L. Roe	—	1900	71	do	30	48	—	—
Bf 10	Allen McFarland	—	1902	54	do	14	48	—	—
Bf 11	Chino Farms	—	1901	65	do	25	48	—	—
Bf 12	Jas. C. Thompson	—	1900	65	do	30	48	—	—
Bf 13	Do	—	1900	65	do	30	48	—	—
Bf 14	Brown Estates	—	1902	65	do	30	48	—	—
Bf 15	J. H. Holden	—	1903	63	do	27	48	—	—

47

Annes and Talbot Counties

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gal. per min.	Date				
Calvert	29.56[m]	—	9/27/51	N	40	1947	—	N	—	
Aquia	4	25	11/16/51	(?),E	40	11/16/51	2.0	C	—	Small store. Water reported good. See driller's log.
do	—	20	1950	C,E	50	1950	2.5+	D	57	Water reported good. Flowing well, 15 gpm. See driller's log.
Calvert	31	40	10/26/47	J,E	60	10/26/47	6.5	C	—	Water reported fair. Used for cooling alfalfa meal. See driller's and sample logs.
Talbot	—	—	—	N	—	—	—	N	—	Observation well. Flows at times.
Aquia	40	—	2/11/53	N	—	—	—	N	—	Well abandoned. Water at 92 ft. Water reported irony.
do	43	73	1951	J,E	25	1951	0.8	F	—	Water slightly irony. See driller's log.
do	18	70	7/10/52	J,E	12	7/10/52	.2	C	54	Store. See driller's log and chemical analysis.
Wicomico	7.7	32	10/10/51	J,E	20	10/10/51	.8	D	63	See driller's log.
Aquia(?)	31	36	11/16/53	T,E	20	11/16/53	4.0	D	—	Swimming pool. See driller's log.
Aquia	30.60[m]	—	8/20/53	J,E	—	—	—	D,F	—	Water reported irony.
Wicomico	13	—	8/19/53	C,E	—	—	—	D,F	—	Water reported soft, good. Brick-lined.
do	37	—	8/24/53	J,E	—	—	—	D,F	—	Do
do	8	—	8/24/53	C,E	—	—	—	D,F	—	Water reported very good. Three other driven wells on property; all 14 ft deep with water levels about 8 ft.
Aquia	30	—	8/24/53	J,E	—	—	—	D,F	—	Water reported fairly soft.
Wicomico	30	—	8/24/53	C,W	—	—	—	D	—	Water reported soft. Brick-lined.
Aquia	—	—	—	—	—	—	—	D,F	—	
do	—	—	—	—	—	—	—	C	—	Restaurant. See sample log.
do	46	60	10/12/48	C,E	40	10/12/48	2.9	D,F	—	Water reported irony.
do	18	24	2/—/48	C,E	30	2/—/48	5.0	D,F	—	See driller's log.
Talbot	—	—	—	C,E	—	—	—	D,F	—	
do	—	—	—	C,E	—	—	—	D,F	—	
Aquia	20	25	2/—/48	T,E	30	2/—/48	6.0	D	—	Water softener used. See driller's and sample logs.
do	29	55	7/16/52	J,E	60	7/16/52	2.3	D,F	—	Water reported good. See driller's log.
do	60	65	2/—/48	J,E	60	2/—/48	12.0	F	—	Water reported hard. See driller's log.
Wicomico	15	—	8/4/53	C,E	—	—	—	D,F	—	Water reported very good.
do	18	—	8/4/53	C,E	—	—	—	D,F	—	Do
do	9	—	8/20/53	C,E	—	—	—	D,F	—	Do
do	33	—	8/20/53	C,E	—	—	—	D	—	Water reported poor.
do	14.5	—	8/20/53	C,E	—	—	—	D	—	Water reported very good. Brick-lined.
do	13	—	8/20/53	C,E	—	—	—	F	—	Do
do	15	—	8/20/53	C,E	—	—	—	D,F	—	Do
do	15	—	8/20/53	C,E	—	—	—	D,F	—	Do

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bf 16	C. M. Newsome	—	1925	70	Driven	30	1½	—	—
Bf 17	Jas. F. Capel	—	1928	75	Dug	27	60	—	—
Bf 18	Barrett Savington	—	1900	65	do	15	42	—	—
Bf 19	Albert Savington	—	1900	85	do	20	48	—	—
Bf 20	Newton Younger	—	1948	60	Driven	12	1½	—	—
Bf 21	Do	—	1948	60	do	12	1½	—	—
Bf 22	Jas. Bailey	—	1950	78	do	15	1½	—	—
Bf 23	Hollie Oren	—	1900	70	Dug	16	48	—	—
Bf 24	Alton Scott	—	1895	70	do	27	48	—	—
Bf 25	Charles H. Silcox	—	1946	60	Drilled	150	3½	—	—
Bf 26	John Black	—	1928	20	Driven	20	1½	—	—
Bf 27	Dr. M. Banus	—	1900	37	Dug	22	48	—	—
Bf 28	Mrs. Bertha Squires	—	1898	72	do	10	48	—	—
Bf 29	J. A. Van Sant	—	1945	27	Drilled	180	4	180	0
Bf 30	Lloyd Gale	—	1900	22	Dug	24	54	—	—
Bf 31	Brown Estate	J. N. Unruh	1953	60	Drilled	73	4	—	—
Bg 1	Peter W. Jopling	—	—	60	Dug	20	33	—	—
Bg 2	E. W. Van Sant	J. N. Unruh	1949	50	Drilled	107	4	66	—
Bg 3	T. W. Sandskroener	M. A. Pentz	1947	20	do	103	4	40	0
Bg 4	George E. Clark	J. N. Unruh	1950	20	do	92	4	83	0
Bg 5	L. Massey	do	1951	60	do	153	4	136	0
Bg 6	J. N. Harriman	M. A. Pentz	1951	68	do	85	4	63	0
Bg 7	J. E. Weist	—	1933	50	Driven	50	1½	—	—
Bg 8	Ed Gillespie & Son	—	1928	50	do	15	1½	—	—
Bg 9	Eastburn, Ed. Stevens, Manager	—	1928	73	do	27	1½	—	—
Bg 10	Dudley Roe	—	1928	60	do	32	1½	—	—
Bg 11	John Malliew	—	1936	65	do	42	1½	—	—
Bg 12	J. Clawson Jones	—	1953	74	do	34	1½	—	—
Bg 13	Preston Lee	—	1950	64	do	32	1½	—	—
Bg 14	George Short	—	—	64	do	26	1½	—	—
Bg 15	Joe George	—	1928	70	do	36	1¾	—	—
Bg 16	Mrs. Annie Merrick	—	1933	70	do	32	1½	—	—
Bg 17	Linwood Cronshaw	—	1927	60	do	31	1½	—	—
Bg 18	W. D. Roe & Son	—	1944	65	do	45	1¼	—	—
Bg 19	Joe George	—	1928	69	do	27	1½	—	—
Bg 20	John W. Smith	—	—	68	do	30	1½	—	—
Bg 21	Do	—	—	68	do	28	1½	—	—
Bg 22	Wilson Walls	—	1933	55	do	30	1½	—	—
Bg 23	Do	—	1953	60	do	30	1½	—	—
Bg 24	Mrs. Elsie G. Sudler	—	1925	70	do	27	1½	—	—
Bg 25	Rolland Golt	—	1946	72	do	44	1¾	—	—
Bg 26	Buck Lloyd	—	—	68	do	34	1½	—	—
Bg 27	Rigby Stafford	—	1950	58	do	22	2	—	—
Bg 28	E. L. Walmsley	—	1945	64	do	27	1½	—	—
Bg 29	J. Rodney Dixon	—	1948	55	Dug	25	48	—	—
Bg 30	Earle Glanding	—	1900	54	do	30	54	—	—
Bg 31	Pennington Brothers	—	1950	62	Driven	17	1½	—	—
Bg 32	L. M. Dulin	—	1912	62	do	27	1½	—	—
Bg 33	Murray Perkins	—	—	70	do	27	1½	—	—

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gal. per min.	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Wicomico	—	—	—	C,E	—	—	—	D,F	—	Water reported very Good.
do	11.3	—	8/20/53	C,G	—	—	—	D,F	—	Do
do	11	—	8/20/53	C,E	—	—	—	D,F	—	Do
do	11	—	—	C,H	—	—	—	D,F	—	Water reported poor.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported very good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	9.50[m]	—	8/20/53	C,H	—	—	—	D,F	—	Do
do	21	—	8/24/53	J,E	—	—	—	D,F	—	Do
Aquia	30	—	8/24/53	J,E	—	—	—	D,F	—	Water reported irony.
Wicomico	—	—	—	C,E	—	—	—	D,F	—	Water reported very good.
do	—	—	—	J,E	—	—	—	D	—	Do
do	6.40[m]	—	8/24/53	C,H	—	—	—	D	—	Water reported very poor.
Aquia	—	—	—	C,E	—	—	—	D,F	—	Water reported very good.
Talbot	20	—	8/24/53	C,E	—	—	—	D,F	—	Do
Calvert(?)	—	—	—	—	—	—	—	N,H	—	Abandoned dug well, 43 ft. deep, on property also. See driller's log.
Wicomico	16.73[m]	—	9/27/51	S,H	—	—	—	D	59.9	Water reported irony.
Aquia	32	50	9/10/49	J,E	20	9/10/49	1.1	D	—	Softener used. See driller's log.
do	17	27	8/22/47	T,E	100	8/22/47	10.0	D	—	Do
do	18	48	7/—/50	C,E	20	7/—/50	.6	D	—	Water reported good. See driller's log.
do	37	79	7/—/51	J,E	25	7/—/51	.6	D,F	—	Probably irony. See driller's log.
Calvert	20	30	6/15/51	C,E	100	6/15/51	10.0	D	—	Water reported good. See driller's log.
Wicomico	14	—	8/3/53	C,E	—	—	—	D,F	—	Water reported very good.
do	8	—	8/3/53	C,E	—	—	—	C	—	Cement block plant. Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported very good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Water reported hard, irony. Inadequate supply.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported irony.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Water reported irony.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Water reported good. Another driven well at barn; same depth and diameter.
do	—	—	—	J,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported somewhat hard.
do	11	—	8/13/53	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported fair.
do	17	—	8/18/53	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	14	—	8/18/53	C,E	—	—	—	D,F	—	Water reported slightly irony.
do	—	—	—	S,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	J,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of (screen feet)
Bg 34	Mrs. Spencer Truitt	—	1946	65	Driven	27	1½	—	—
Bg 35	John W. Smith	—	1899	55	Dug	28	48	—	—
Bg 36	Kenneth Smith	—	—	60	Driven	28	1½	—	—
Bg 37	Ralph Leiby	—	—	60	do	30	1½	—	—
Bg 38	Dudley G. Roe	—	1941	65	do	35	1½	—	—
Bg 39	Do	—	1943	65	do	35	1½	—	—
Bg 40	Miss Ella Roberts	—	1853	45	Dug	30	48	—	—
Bg 41	Medford Graham	Ennis Brothers	1948	55	Drilled	145	4	—	0
Bg 42	Do	—	1903	55	Dug	20	48	—	—
Bg 43	Morris Walls	Ennis Brothers	1948	55	Drilled	140	4	—	0
Bg 44	Do	—	1902	55	Dug	24	48	—	—
Bg 45	George Short	—	1901	60	do	26	54	—	—
Bg 46	Albert Deemer	—	1900	60	do	16	48	—	—
Bg 47	H. D. Godfrey	—	1901	55	do	21	4	—	—
Bg 48	Clarence Shehan	—	1898	60	do	13	48	—	—
Bg 49	Do	—	1899	60	do	14	48	—	—
Bg 50	Walter Lindsey	—	1953	45	Drilled	108	4	108	—
Bg 51	Charles Adkinson	—	1945	65	do	105	3	105	—
Bh 1	J. F. Everett	—	—	60	Dug	14	48	—	—
Bh 2	Sylvester Everett	—	—	65	Driven	23	1¼	—	—
Bh 3	Norman Welch	—	1948	62	do	30	1½	—	—
Bh 4	Joseph Talosi	—	1947	65	do	11	1½	—	—
Bh 5	H. W. Briggs	—	—	66	do	12	1½	—	—
Bh 6	James A. Wooleyhan	—	1941	65	do	40	1½	—	—
Bh 7	Do	—	1948	65	do	35	1½	—	—
Bh 8	Omar Clow	—	1951	62	do	22	1½	—	—
Bh 9	Harry Gross	—	1953	67	do	35	1¼	—	—
Bh 10	Do	—	1945	67	do	—	1½	—	—
Bh 11	Marco Panieri	—	1939	70	do	19	1½	—	—
Bh 12	Elva Starkey	—	1927	62	do	24	1½	—	—
Bh 13	Do	—	1951	62	do	30	1¼	—	—
Bh 14	Joseph Leager	—	—	65	Dug	24	48	—	—
Bh 15	E. C. Hudson	—	—	62	Driven	40	2	—	—
Bh 16	Goodwin Davis	—	1950	55	do	20	1½	—	—
Bh 17	Robert McGinnis	—	1920	62	do	33	1½	—	—
Bh 18	Mrs. Frank Brower	—	—	58	Dug	22	48	—	—
Bh 19	Do	—	—	58	do	22	48	—	—
Bh 20	Lee Nice	—	1927	62	Driven	21	1½	—	—
Bh 21	Spencer Walls	—	1900	80	Dug	30	48	—	—
Bh 22	Do	—	1927	80	Driven	30	1½	—	—
Bh 23	Edward H. Link	—	1901	63	Dug	25	48	—	—
Bh 24	Harry Nuttle	—	1933	62	Driven	28	1½	—	—
Bh 25	Joseph Harwath	—	1899	62	Dug	16	48	—	—
Bh 26	Do	—	1951	62	Driven	38	1½	—	—
Bh 27	Do	—	1900	60	Dug	28	54	—	—
Bh 28	Do	—	1902	60	do	26	54		—
Bh 29	Elwood Jackson	—	1949	50	Driven	30	1½	—	—
Bh 30	Arley Dunning	—	1900	61	Dug	18	48	—	—
Bh 31	Ralph K. Jackson	—	1900	55	do	20	48	—	—
Bh 32	Leroy C. Jones	—	1939	60	Driven	35	1½	—	—
Bh 33	Harvey Jackson	—	1943	62	Drilled	230	4	230	—

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gal. per min.	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Wicomico	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do		—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	17	—	8/19/53	C,E	—	—	—	D	—	Do
do	17	—	8/19/53	C,E	—	—	—	F	—	Do
do	—	—	—	C,H	—	—	—	D,F	—	Do
Monmouth	40	—	8/19/53	J,E	—	—	—	D,F	57	
Wicomico	16	—	8/19/53	C,H	—	—	—	F	—	Do
Monmouth	37.30[m]	—	8/19/53	C,E	—	—	—	F	55	Water unfit for drinking because of hydrogen sulfide odor and taste. See chemical analysis.
Wicomico	12.5	—	8/19/53	C,H	—	—	—	D	—	Water reported good.
do	—	—	—	C,H	—	—	—	D,F	—	Do
do	11.5	—	8/19/53	C,H	—	—	—	D	—	Do
do	14.00[m]	—	8/19/53	C,H	—	—	—	D,F	—	Do
do	9.60[m]	—	8/19/53	C,H	—	—	—	D	—	Do
do	9.15[m]	—	8/19/53	C,H	—	—	—	F	—	Do
Aquia	43	—	8/19/53	J,E	—	—	—	D,F	—	Water reported hard.
do	10	—	8/19/53	C,E	—	—	—	D,F	—	Water reported moderately hard.
Wicomico	11	—	7/9/53	C,E	—	—	—	D,F	59.5	Water reported hard. Brick-lined.
do	7.39[m]	—	7/9/53	C,H	—	—	—	D,F	57.5	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	5.35[m]	—	7/9/53	C,H	—	—	—	D,F	58	Do
do	3.54[m]	—	7/9/53	H	—	—	—	N	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	C	—	Motel. Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	12	—	7/10/53	J,E	—	—	—	D,F	—	Do
do	8.45[m]	—	7/10/53	C,H	—	—	—	D	—	Water reported slightly irony.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	14	—	8/13/53	C,E	—	—	—	D,F	—	Water reported fair.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	18	—	—	C,E	—	—	—	D,F	—	Do
do	15	—	8/13/53	C,H	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	18	—	8/17/53	C,H	—	—	—	D	—	Do
do	—	—		C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	11	—	8/17/53	C,E	—	—	—	D,F	—	Do
do	11.30[m]	—	8/17/53	C,H	—	—	—	F	—	Water reported very poor.
do	12	—	8/17/53	J,E	—	—	—	D,F	—	Water reported good.
do	22	—	8/17/53	C,H	—	—	—	D	—	Do
do	20	—	8/17/53	C,H	—	—	—	F	—	Do
do	11	—	8/17/53	C,E	—	—	—	D,F	—	Do
do	7	—	8/17/53	C,E	—	—	—	D,F	—	Do
do	6.5	—	8/17/53	J,E	—	—	—	D,F	—	Do
do	17	—	8/17/53	J,E	—	—	—	D,F	—	Water reported slightly irony.
Aquia	22	—	8/17/53	J,E	—	—	—	D,F	—	Water reported good.

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Bh 34	Pratt Van Sant	—	—	62	Driven	30	1½	—	—
Bh 35	Ed Baxter	—	1941	43	do	27	1½	—	—
Bh 36	Do	—	1947	45	do	27	1½	—	—
Bh 37	Rolland Everett	—	—	45	Dug	18	48	—	—
Bh 38	Do	—	—	56	Driven	22	1½	—	—
Bh 39	Nat Leager	—	—	65	do	22	1½	—	—
Bh 40	Charles Glanding	—	1923±	65	do	27	1½	—	—
Bh 41	Do	—	1923±	65	Dug	30±	48	—	—
Cd 1	General Lieber	M. A. Pentz	1951	23	Drilled	108	4	93	0
Cd 2	C. S. Richardson	—	1899	28	Dug	15	48	—	—
Cd 4	Do	—	1899	28	do	14	48	—	—
Cd 4	Do	—	1898	28	do	11	48	—	—
Ce 1	H. F. Callahan	M. A. Pentz	1952	60	Drilled	218	4	163	0
Ce 2	Robert Larrimore	do	1948	40	do	170	4	102	0
Ce 3	Albert Green	do	1952	50	do	134	4	90	0
Ce 4	Tilghman H. Moyer	do	1952	24	do	92	4	88	4
Ce 5	Seth Linthicum	—	1900	60	Dug	30	48	—	—
Ce 6	Do	—	1900	60	do	28	48	—	—
Ce 7	Do	—	1900	60	Driven	26	1½	—	—
Ce 8	Do	—	1928	58	do	22	1½	—	—
Ce 9	Stanley Walker	—	1928	68	do	30	1½	—	—
Ce 10	J. W. Croud	—	1945	62	Drilled	85	4	81	0
Ce 11	Eliason Legg	—	1900	68	Dug	30	48	—	—
Ce 12	Bernard Merrick	—	1941	68	do	30	48	—	—
Ce 13	Van Clark, Sr.	—	1900	65	do	27	48	—	—
Ce 14	Do	—	1900	65	do	27	48	—	—
Ce 15	J. W. Crowl	—	—	60	do	30	48	—	—
Ce 16	Mrs. F. L. Benney	—	1900	58	do	30	48	—	—
Ce 17	Charles West	—	1900	64	do	23	48	—	—
Ce 18	F. Wallace Jarman	M. A. Pentz	1946	50	Drilled	181	3	180	0
Ce 19	B. K Stevens	do	1940	50	do	288	4	80	0
Ce 20	Do	do	1945	58	do	180	3	80	0
Ce 21	Ernest Rothwell	—	1941	50	do	—	—	—	—
Ce 22	Carl Starkey	—	1900	60	Dug	24	48	—	—
Ce 23	Joe McGinnis	—	1900	40	do	24	48	—	—
Ce 24	Ruford Townsend	A. W. Hudson	1953	70	Drilled	180	2½–1½	180	0
Ce 25	Frank Saunders	—	1899	34	Dug	30	48	—	—
Ce 26	Al Reiken	—	1900	64	do	27	48	—	—
Ce 27	C. P. Crane	—	1933	55	Drilled	190	6	190	—
Ce 28	Wm. R. Burns	—	1948	20	do	300	3½	—	—
Ce 29	Howard Lane	—	1900	65	Dug	20	48	—	—
Ce 30	Ed Larrimore	—	1900	37	do	27	48	—	—
Ce 31	Do	—	1899	39	do	28	54	—	—
Ce 32	Amos Hynson	—	—	50	do	24	60	—	—
Ce 33	Annie C. Kennedy	—	1953	60	do	18	42	—	—

—Continued

Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gal. per min.	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Wicomico	—	—	—	C,E	—	—	—	D,F	—	Water reported very good. Brick-lined.
do	—	—	—	C,E	—	—	—	DF	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	11.20^{m}	—	8/18/53	C,E	—	—	—	D	—	Do
do	11	—	8/18/53	C,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	—,E	—	—	—	F	—	Water reported slightly irony. Never dry; good yield; well on sink-hole ridge.
do	—	—	—	—,E	—	—	—	D	—	
Aquia	29	40	5/30/51	C,E	100	5/30/51	9.1	D	—	Water unfit for drinking. See driller's log.
Wicomico	5.5	—	8/25/53	C,E	—	—	—	D	—	Water reported good.
do	6	—	8/25/53	C,E	—	—	—	D,F	—	Do
do	8	—	8/25/53	C,H	—	—	—	D	—	Do
Aquia	61	83	12/26/57	J,E	60	12/26/52	2.8	D,F	—	Water reported good. See driller's log.
do	31	50	11/20/48	J,E	80	11/20/48	4.2	D	60	Water reported hard, irony. Measured depth 128 ft. Static level 33 ft. below land surface, 7/3/53. See driller's log.
do	43	50	8/30/52	J,E	100	8/30/52	14.3	D,F	—	Water reported hard. See driller's log.
do	31	64	10/1/52	J,E	8.5	10/1/52	.3	D,F	—	Water reported good. See driller's log.
Wicomico	20	—	7/24/53	C,E	—	—	—	D	—	Water reported good.
do	20	—	7/24/55	C,E	—	—	—	F	—	Do
do	20	—	7/24/53	C,E	—	—	—	D,F	—	Do
do	13	—	7/24/53	C,H	—	—	—	D	—	Do
do	16	—	7/24/53	C,E	—	—	—	D,F	—	Do
Calvert	9	—	7/24/53	S,E	—	—	—	D,F	—	Do
Wicomico	20	—	7/24/53	C,H	—	—	—	D,F	—	Do
do	18	—	7/24/53	J,E	—	—	—	D,F	—	Do
do	19	—	7/24/53	S,E	—	—	—	D		Do
do	18	—	7/24/53	C,G	—	—	—	F	—	Do
do	—	—	7/24/53	J,E	—	—	—	D,F	—	Do
do	17	—	7/27/53	C,E	—	—	—	D,F	—	Do
do	13.5	—	7/29/53	C,E	—	—	—	D,F	—	Do
Aquia	40	—	7/29/53	J,E	—	—	—	D,F	—	Water reported very hard.
do	62	—	7/29/53	J,E	—	—	—	D,F	—	Water reported good
do	43	—	7/29/53	J,E	—	—	—	D,F	—	Do
—	—	—	—	—	—	—	—	—	—	Water reported good. Drilled for prisoner-of-war camp.
Wicomico	17	—	7/29/53	C,H	—	—	—	D	—	Water reported fair.
do	18	—	7/28/53	J,E	—	—	—	D,F	—	Water reported good.
Aquia	68	80	8/3/53	J,E	20	8/3/53	1.7	D	—	Water reported good. See driller's log.
Wicomico	21	—	—	C,H	—	—	—	DF	—	Water reported good.
do	15	—	8/25/53	C,E	—	—	—	D	—	Do
Aquia	53.60^{m}	—	8/25/53	J,E	—	—	—	D,F	—	Water reported a little hard.
Matawan	—	—	—	C,E	—	—	—	D,F	—	Water reported good. Brick-lined.
Wicomico	14	—	8/25/53	C,E	—	—	—	D,F	—	Do
do	13.5	—	8/25/53	C,E	—	—	—	F	—	Do
do	11	—	8/25/53	C,E	—	—	—	D,F	—	Do
do	14	—	8/25/53	S,E	—	—	—	D,F	—	Do
do	14.00^{m}	—	8/25/53	C,H	—	—	—	D	—	Do

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ce 34	Fred Baynard	—	1933	45	Dug	20	48	—	—
Ce 35	Romie Payne	—	1900	60	do	20	48	—	—
Cf 1	Ross Rhodes	M. A. Pentz	1953	40	Drilled	160	3	104	0
Cf 2	Church Hill Fire Co.	do	1950	42	do	170	4	130	0
Cf 3	C. A. Smith	do	1952	40	do	190	3	106	0
Cf 4	C. Radha	do	1952	40	do	180	3	127	0
Cf 5	D. Thompson Swing	Ennis Brothers	1947	68	do	50	8	—	20
Cf 6	Do	do	1949	67	do	202	4	102	—
Cf 7	Dr. J. W. Crowl & Co.	—	—	68	Driven	27	1½	—	—
Cf 8	Wm. Turner Morris	—	—	62	do	30	1½	—	—
Cf 9	Charles E. Boone	—	1900	62	Dug	22	48	—	—
Cf 10	Milton Stant	—	1900	65	do	24	48	—	—
Cf 11	Charles West	—	1900	50	do	26	48	—	—
Cf 12	Casper Seney	—	1900	74	do	27	54	—	—
Cf 13	Caleb Clough	—	1900	73	do	30	54	—	—
Cf 14	J. R. Murphy	—	1900	72	Driven	32	1½	—	—
Cf 15	A. M. McGlason	M. A. Pentz	1940	60	Drilled	280	4	80	0
Cf 16	Howard Stant	—	—	66	Driven	22	1½	—	—
Cf 17	C. E. Larrimore	—	1900	66	Dug	40	60	—	—
Cf 18	Franklin Walls	—	1919	65	Driven	27	1½	—	—
Cf 19	Mrs. Annie Merrick	—	1900	75	Dug	40	54	—	—
Cf 20	Jimmie Johns	—	1900	62	do	30	48	—	—
Cf 21	Barclay Stanton	—	1941	64	Driven	40	1½	—	—
Cf 22	Do	—	1941	64	do	29	1½	—	—
Cf 23	Charles E. Boone	—	1952	60	do	30	1½	—	—
Cf 24	Casper Seney	—	1925	74	do	32	1½	—	—
Cf 25	Mrs. Lemuel Roberts	—	1900	62	Dug	27	48	—	—
Cf 26	J. R. Smith	—	1928	83	Driven	32	1½	—	—
Cf 27	Earle J. Everett	—	1946	76	do	30	1½	—	—
Cf 28	Mrs. Mary Coppage	—	928	85	Dug	22	54	—	—
Cf 29	I. E. Dolby	—	1900	67	do	27	48	—	—
Cf 30	Do	—	1900	67	do	28	48	—	—
Cf 31	Calvin Dean	—	—	67	Driven	20	1½	—	—
Cf 32	Do	—	1900	50	Dug	22	48	—	—
Cf 23	Lee Clough	—	1900	79	do	27	48	—	—
Cf 34	Miss Dora Powell	—	1923	79	do	27	48	—	—
Cf 35	C. P. Merrick	—	1900	79	do	27	48	—	—
Cf 36	Mrs. Harry Elburn	—	1900	79	do	30	48	—	—
Cf 37	J. E. Coppage	—	1885	70	do	18	48	—	—
Cf 38	Milford B. Patmatory & Co.	—	1900	70	do	22	48	—	—
Cf 39	Do	M. A. Pentz	1951	70	Drilled	190	4	190	0
Cf 40	Edward & Elmer Morris	—	1898	70	Dug	22	48	—	—
Cf 41	Wm Hall	—	1902	40	do	25	48	—	—
Cf 42	Holden Roberts	—	1951	70	Driven	25	1½	—	—
Cf 43	Do	—	—	70	do	27	1½	—	—
Cf 44	Ben Lee	—	1928	65	Dug	22	48	—	—
Cf 45	Do	—	—	79	do	27	48	—	—
Cf 46	E. S. Valliant, Jr.	—	1901	60	do	32	96	—	—

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gal. per min.	Date				
Wicomico	15	—	8/25/53	C,H	—	—	—	D	—	Water reported good. Brick-lined.
do	14	—	8/25/53	C,E	—	—	—	D	—	Do
Aquia	29	37	3/2/53	J,E	40	3/2/53	5.0	D	—	Water reported good. See driller's log.
do	26	33	1/—/50	J,E	60	1/—/50	8.5	P	—	See driller's log. Field test: Fe 1.7, H 155, pH 7.4. See chemical analysis.
do	29	35	2/19/52	J,E	30	2/19/52	5.0	D	—	Apartment house. Water reported good. See driller's log.
do	30	39	5/12/52	J,E	20	5/12/52	2.2	D	—	Water reported good. See driller's log.
Wicomico-Calvert	14	30	3/11/47	T,E	140	3/11/47	8.7	C	—	Field test: Fe tr, H 26 ppm, pH 6.9. Cannery. See driller's log and chemical analysis.
Aquia	20	77	1/27/49	J,E	15	1/27/49	.3	D	—	Water reported good. See driller's log.
Wicomico	—	—	7/24/53	C,H	—	—	—	D,F	—	Water reported good.
do	16	—	7/24/53	C,E	—	—	—	D	—	Do
do	16	—	7/27/53	J,E	—	—	—	D	—	Water reported good. Brick-lined.
do	17	—	7/28/53	C,E	—	—	—	D,F	—	Do
do	—	—	7/28/53	C,H	—	—	—	D,F	—	Water reported fair.
do	15	—	7/28/53	C,E	—	—	—	D	—	Water reported good.
do	20	—	7/29/53	C,E	—	—	—	D,F	—	Do
do	20	—	7/29/53	C,E	—	—	—	D,F	—	Do
—	—	—	—	J,E	—	—	—	D,F	—	Water reported good.
Wicomico	—	—	—	C,H	—	—	—	D,F	—	Water reported fairly good.
do	18	—	7/29/53	C,G	—	—	—	D,F	—	Water reported good.
do	20	—	7/29/53	C,E	—	—	—	D,F	—	Do
do	18	—	7/29/53	C,E	—	—	—	D,F	—	Do
do	15	—	7/29/53	C,E	—	—	—	D,F	—	Do
do	20	—	7/29/53	J,E	—	—	—	F	—	Do
do	17	—	7/29/53	S,E	—	—	—	D	—	Water reported irony.
do	16	—	7/27/53	J,E	—	—	—	F	—	Water reported good.
do	—	—	—	C,E	—	—	—	F	—	Do
do	20	—	8/3/53	C,G	—	—	—	D,F	—	Water reported fair.
do	14	—	8/3/53	S,E	—	—	—	D,F	—	Water reported good.
do	17	—	8/3/53	J,E	—	—	—	D,F	—	Water reported slightly hard.
do	12	—	8/3/53	C,E	—	—	—	D,F	—	Water reported good.
do	19	—	8/4/53	C,H	—	—	—	D	—	Do
do	19	—	8/4/53	C,G	—	—	—	D,F	—	Water reported fair.
do	—	—	—	J,E	—	—	—	D,F	—	Water reported good.
do	16	—	8/4/53	C,E	—	—	—	D,F	—	Do
do	19	—	8/4/53	J,E	—	—	—	D,F	—	Do
do	18	—	8/4/53	C,E	—	—	—	D,F	—	Water reported poor.
do	18	—	8/4/53	C,E	—	—	—	D,F	—	Water reported good.
do	19	—	8/4/53	C,E	—	—	—	D,F	—	Water reported hard, irony.
do	11	—	8/4/53	C,G	—	—	—	D,F	—	Water reported good.
do	12	—	8/4/53	C,H	—	—	—	D	—	Do
Eocene series	11	—	8/4/53	J,E	—	—	—	D,F	—	Water reported good.
Wicomico	17	—	8/4/53	C,E	—	—	—	D,F	—	Do
do	19	—	8/5/53	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D	—	Water reported irony.
do	—	—	—	C,E	—	—	—	F	—	Water reported good.
do	18	—	8/5/53	C,H	—	—	—	D	—	Water reported fair.
do	19	—	8/5/53	C,E	—	—	—	D,F	—	Water reported good.
do	20	—	8/5/53	C,E	—	—	—	D,F	—	Do

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Cf 47	M. A. Perkins	—	—	69	Dug	25	48	—	—
Cf 48	J. W. Jarvis	M. A. Pentz	1952	70	Drilled	230	4	163	0
Cf 49	Henry Evans	—	1903	58	Dug	25	48	—	—
Cf 50	Romie Townsend	—	1901	60	do	27	48	—	—
Cf 51	Albert Shrader	—	1902	55	do	22	48	—	—
Cf 52	Ervin Gardner	—	1898	73	do	25	48	—	—
Cf 53	Do	—	1899	73	do	27	54	—	—
Cf 54	Brown Estates	—	1898	40	do	45	54	—	—
Cf 55	Do	—	1913	40	do	40	48	—	—
Cf 56	Do	—	1933	40	Driven	32	1½	—	—
Cf 57	Frank Goldsborough	—	1943	79	do	22	1½	—	—
Cf 58	Allen Cohey	—	—	58	Dug	60	48	—	—
Cf 59	D. Thompson Swing	—	1954	67	Drilled	55	10	31.7	25
Cf 60	Do	—	—	72	Driven	45	1¼	—	—
Cf 61	Do	Coop. Ground-Water Staff	1955	67	—	59	4	—	0
Cf 62	Do	do	1955	67	—	12	5	10	0
Cg 1	Town of Barclay	M. A. Pentz	1949	67	Drilled	60+	4	50	10
Cg 2	Do	do	1949	67	do	54.2	4	—	10
Cg 3	George Crisfield	—	1932	68	Driven	32	1½	—	—
Cg 4	A. C. Williamson	—	1941	63	do	30	1½	—	—
Cg 5	Murray Perkins	—	1947	78	do	65	1½	—	—
Cg 6	Arthur Truitt	—	1946	85	do	32	1½	—	—
Cg 7	John Coppage	—	1899	65	Dug	25	54	—	—
Cg 8	Do	—	1928	72	Driven	32	1½	—	—
Cg 9	Harry Nuttle	—	1943	72	Drilled	135	3½	—	—
Cg 10	Edward Graham	—	1928	75	Driven	80	1½	—	—
Cg 11	Mrs. Sarah Debenish	—	1900	75	Dug	20	48	—	—
Cg 12	Do	—	—	75	Driven	25	1½	—	—
Cg 13	Roger Wilson	—	—	75	do	27	1½	—	—
Cg 14	Ernest Theriault	—	1928	74	do	32	1½	—	—
Cg 15	Clawson Jones	—	1928	74	do	32	1½	—	—
Cg 16	U. B. Tarr	—	—	74	do	30	1½	—	—
Cg 17	James Cosden	—	1943	73	do	20	1½	—	—
Cg 18	Do	—	1952	73	do	22	1½	—	—
Cg 19	Norman Walls	—	1928	73	do	22	1½	—	—
Cg 20	Do	—	1928	73	do	24	1½	—	—
Cg 21	Webster Holland	—	1952	77	do	35	1½	—	—
Cg 22	Do	—	1952	77	do	35	1½	—	—
Cg 23	Edward Embert	—	1945	76	do	34	1½	—	—
Cg 24	Conrad Rochester	—	1928	75	do	32	1½	—	—
Cg 25	Richard Carter	—	1900	74	Dug	27	48	—	—
Cg 26	Do	—	1939	74	Driven	45	1½	—	—
Cg 27	Do	—	1939	74	do	28	1½	—	—
Cg 28	Louis Pluggie	—	1928	74	do	27	1½	—	—
Cg 29	Elmer Morris	—	1935	56	do	30	1½	—	—
Cg 30	Floyd Price	—	1928	78	do	35	1½	—	—
Cg 31	Do	—	1900	78	Dug	20	48	—	—
Cg 32	Mrs. O. D. Merrick	—	1928	64	Driven	35	1½	—	—
Cg 33	Do	—	1901	64	Dug	23	48	—	—

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gal. per min.	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Wicomico	18	—	8/5/53	C,E	—	—	—	D,F	—	Water reported good.
Aquia	63	70	2/19/52	J,E	90	2/19/52	12.8	D,F	—	Water reported good. See driller's log.
Wicomico	—	—	—	C,H	—	—	—	D	—	Water reported good.
do	19	—	8/11/53	J,E	—	—	—	D,F	—	Do
do	14	—	8/11/53	C,E	—	—	—	D,F	—	Do
do	17	—	8/11/53	C,E	—	—	—	D	—	Do
do	19	—	8/11/53	C,E	—	—	—	F	—	Do
do	33	—	8/19/53	J,E	—	—	—	D,F	—	Do
do	28	—	8/19/53	J,E	—	—	—	D,F	—	Do
do	20	—	8/19/53	C,H	—	—	—	D	—	Do
do	7.52^{m}	—	9/1/53	C,H	—	—	—	D	—	Water reported very poor. Well goes dry.
do	—	—	—	J,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	T,E	200	5/4/55	—	C	—	Cannery. Screen position: 29–54 feet. See driller's log.
do	10.13^{m}	—	4/12/55	C,H	—	—	—	D	—	
do	7.0^{m}	—	10/20/55	N	—	—	—	N	—	Power augered test hole; filled and abandoned. See driller's log.
do	7.15^{m}	—	4/12/55	N	—	—	—	N	—	Hand augered test hole, 50 ft. east of well Cf 59. See driller's log.
Wicomico-Calvert	5.55^{m}	—	5/10/56	N	270	6/10/49	—	P	—	Fire protection. Measured depth 44.6 feet. See driller's log.
Wicomico	5.78^{m}	—	5/10/56	N	45	5/10/56	—	P	—	Fire protection.
do	—	—	—	C,H	—	—	—	D,F	—	Water reported good.
do	—	—	—	C	—	—	—	D,F	—	Water reported irony, hard.
do	17	—	8/3/63	C,E	—	—	—	D,F	—	Water reported slightly hard.
do	10	—	8/3/53	C,E	—	—	—	D,F	—	Water reported good.
do	16	—	8/3/53	C,E	—	—	—	D,F	—	Do
do	18	—	8/3/53	C,E	—	—	—	D,F	—	Do
Calvert	—	—	—	C,E	—	—	—	D,F	—	Water reported hard.
Wicomico	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	14	—	8/5/53	C,H	—	—	—	F	—	Water reported fair.
do	—	—	—	C,H	—	—	—	D	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	F	—	Do
do	—	—	—	C,H	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
lo	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	—	—	—	S,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	S,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Cg 34	Mrs. Annie Merrick	—	1948	62	Driven	40	1½	—	—
Cg 35	Douglas Rochester	—	1927	67	do	25	1½	—	—
Cg 36	J. C. Jones	—	1948	67	do	32	1½	—	—
Cg 37	Charlie Thompson	—	—	56	—	32	1½	—	—
Cg 38	The Quill Farm	—	1948	60	Driven	37	1½	—	—
Cg 39	B. H. Bures & Co.	—	1951	75	do	32	1½	—	—
Cg 40	Do	—	1951	69	do	20	1½	—	—
Cg 41	Do	—	1951	69	do	22	1½	—	
Cg 42	Wm. R. Wilson Estate	—	1900	74	Dug	13	54	—	—
Cg 43	Otis Elborn	—	—	68	Driven	25	1½	—	—
Cg 44	George Cranshaw	—	1945	76	do	34	1½	—	—
Cg 45	Franklin Benton	—	1946	74	do	32	1½	—	—
Cg 46	George Massey	—	1900	76	Dug	24	48	—	—
Cg 47	Do	—	1925	75	Driven	32	1½	—	—
Cg 48	Mrs. O. D. Merrick	—	1925	75	do	28	1¼	—	—
Cg 49	Mrs. O. D. Merrick	—		75	do	32	1½	—	—
Cg 50	Do	—	1900	69	Dug	30	54	—	—
Cg 51	W. D. Roe	—	—	63	Driven	32	1½	—	—
Cg 52	Do	—	1925	63	do	30	1½	—	—
Cg 53	Annie G. Merrick	—	1925	70	do	35	1½	—	—
Cg 54	Do	—	1925	70	do	35	1½	—	—
Cg 55	Price Johnson	—	1900	70	Dug	27	54	—	—
Cg 56	Lester Puckett	—	1948	69	Driven	20	1½	—	—
Cg 57	Frank Banks	—	1951	77	do	27	1½	—	—
Cg 58	Edward Rochester	—	1953	73	do	30	1½	—	—
Ch 1	F. Peters	—	1951	67	do	42	1½	—	—
Ch 2	Frank Bezerics	—	1948	70	do	24	1½	—	—
Ch 3	Frank Kovach, Jr.	—	1952	75	do	18	1½	—	—
Ch 4	Frank Bezerics	—	1948	70	do	24	1½	—	—
Ch 5	Do	—	1948	70	do	24	1½	—	—
Ch 6	Do	—	1948	70	do	24	1½	—	—
Ch 7	Albert Anderson	—	1947	74	do	25	1½	—	—
Ch 8	Valentine Gessner	—	1950	75	do	18	1½	—	—
Ch 9	Do	—	—	75	Dug	14	42	—	—
Ch 10	E. Sunderland	—	1952	75	Driven	28	1¼	—	—
Ch 11	Wesley Teat	—	1947	80	do	34	1½	—	—
Ch 12	Jacob Rebman	—	1949	75	do	20–25	1½	—	—
Ch 13	Do	—	1949	75	do	20–25	1½	—	—
Ch 14	Grace Sudler	—	1921	73	do	12	1½	—	—
Ch 15	Prices Chapel	—	—	72	do	16	1½	—	—
Ch 16	Jesse Wheeling	—	—	66	do	28	1½	—	—
Ch 17	Russell Gribbins	—	1950	66	do	—	1½	—	—
Ch 18	Clarence Seward	—	1953	71	do	30	1½	—	—
Ch 19	T. Zaunfuchs	—	1913	76	do	22	1½	—	—
Ch 20	Samuel G. Ware	—	1949	60	do	—	1½	—	—
Ch 21	Carroll Satterfield	—	1920	75	do	27	1½	—	—
Ch 22	Do	—	1950	75	do	22	1½	—	—
Ch 23	Ralph Hall		1950	76	do	27	1½	—	—
Ch 24	F. W. Maennle	—	1949	71	do	20	1½	—	—
Ch 25	F. W. Maennle	—	—	71	do	16	1½	—	—
Ch 26	Herbert Knox	—	—	71	do	12	1½	—	—
Ch 27	N. B. Wooleyhan	—	—	74	do	—	1½	—	—

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gal. per min.	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Wicomico	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,H	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	S,E	—	—	—	D,F	—	Do
do	—	—	—	J,E	—	—	—	D	—	Do
do	—	—	—	J,E	—	—	—	F	—	Do
do	9	—	8/3/53	S,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	12	—	8/3/53	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	F	—	Do
do	21	—	8/11/53	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	19	—	8/12/53	C,E	—	—	—	F	—	Do
do	8.02m	—	9/1/53	C,H	—	—	—	D	—	Do
do	8.6m	—	9/1/53	C,H	—	—	—	D	—	Water reported irony.
do	10	—	9/1/53	C,H	—	—	—	D	—	Water reported good.
do	—	—	—	C,E	—	—	—	D	—	Old dug well abandoned.
do	12	—	7/10/53	C,E	—	—	—	D,F	—	Water reported irony. Four identical wells.
do	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	12	—	7/10/53	C,E	—	—	—	D	—	Water reported irony.
do	12	—	7/10/53	C,E	—	—	—	D	—	Do
do	12	—	7/10/53	C,E	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	D	—	Water reported good.
do	—	—	—	C,H	—	—	—	D	—	Do
do	11.15m	—	7/20/53	C,H	—	—	—	F	—	Water fair; not used for drinking.
do	—	—	—	J,E	—	—	—	D	—	Water reported good.
do	10	—	7/21/53	C,H	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	F	—	Do
do	5.32m	—	7/21/53	C,H	—	—	—	D	—	Water reported irony.
do	5.39m	—	7/21/53	C,H	—	—	—	D	—	
do	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	D	—	Water reported fair. Inadequate supply.
do	15±	—	7/22/53	C,H	—	—	—	D	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,H	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	6.54m	—	7/22/53	C,H	—	—	—	F	—	Do
do	6.84m	—	7/22/53	C,H	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ch 28	Ernest W. Durham	—	1933	72	Driven	21	1¼	—	—
Ch 29	Archie Usilton	—	—	68	do	26	1¼	—	—
Ch 30	W. R. Copeland	—	1949	77	do	27	1¼	—	—
Ch 31	Do	—	1949	77	do	27	1¼	—	—
Db 1	Walter White, Jr.	A. Bailey	1950	16	Drilled	210–225	1¼	140	0
Db 2	David M. Nichols	A. W. Hudson	1951	10	do	225	1¼	189	0
Db 3	Dr. W. Walker	do	1950	6	do	160	1¼	130	0
Db 4	Ben Scharnus	do	1951	18	do	140	1¼	120	0
Db 5	Madison Brown	do	1951	16	do	170	1¼	135	0
Db 6	E. M. Gosnell	do	1953	5	do	280	1¼	240	0
Db 7	Walter Crismer	do	1952	5	do	260	1¼	220	0
Db 8	John Palmer	do	1952	18	do	175	1¼	145	0
Db 9	Md. and Va. Railroad	—	1907	12	do	400	6	—	—
Db 10	Walter White, Sr.	Wm. Aaron	—	15	do	136	1¼	—	—
Dd 1	Alex Stanford	M. A. Pentz	1952	50	do	235	3	104	0
Dd 2	Wesley Washam	do	1952	45	do	201	3	106	0
Dd 3	C. E. Murdock	do	1952	72	do	260	3	108	0
Dd 4	Oliver Jones	M. Harrison	1950	65	do	240	2½	180	0
Dd 5	Do	do	1950	55	do	240	2½	180	0
Dd 6	William Cross	A. Bailey	1950	45	do	215	2½	195	0
Dd 7	Mrs. Inez Jester	Wm. Aaron	1953	40	do	250	2½	220	0
Dd 8	R. D. Baker & Sons	M. A. Pentz	1950	58	do	288	6	180	0
Dd 9	Walter Wentz	Wm. Aaron	1946	50	do	252	2½	230	0
Dd 10	Pioneer Point Farms	Shannahan Artesian Well Co.	1948	10	do	420	6	235	0
Dd 11	Warfield Emory	—	1900	72	Dug	30	42	—	—
Dd 12	Mrs. Sam Chance	—	1941	70	Driven	27	1¼	—	—
Dd 13	Marvin D. Potter	—	1900	68	Dug	45	60	—	—
Dd 14	Do	—	1900	70	do	30	54	—	—
Dd 15	Marion Council	Wm. Aaron	1953	71	Drilled	270	2½–1¼	160	0
Dd 16	Dulin Clark	do	1953	45	do	240	2½	160	0
Dd 17	Adolph Dohler	do	1953	15	do	140	2½	140	0
Dd 18	Mr. Mahan	—	—	20	do	185	3½	—	—
Dd 19	F. A. Buell	—	—	20	do	210	3½	—	—
Dd 20	Mrs. Frank Harper	—	—	23	Dug	16	48	—	—
Dd 21	Mrs. Henry White	—	1899	24	do	20	48	—	—
Dd 22	Do	—	1900	24	do	20	48	—	—
Dd 23	Blakeford Farms, Inc.	—	1900	23	do	13	42	—	—
De 1	Smith Landskroener	J. N. Unruh	1951	60	Drilled	294	4	261	—
De 2	J. O. Pippin	M. A. Pentz	1950	64	do	160	4	106	0

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Water-bearing formation	Water level (feet below land surface) Static	Pump-ing	Date	Pump-ing equip-ment	Yield Gal. per min.	Date	Specific capac-ity (g.p.m./ft.)	Use of water	Tem-pera-ture (°F.)	Remarks
Wicomico	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	J,E	—	—	—	D,F	—	Do
do	—	—	—	J,E	—	—	—	D	—	Do
Monmouth-Aquia	14	17	4/19/50	J,E	15	4/19/50	5.0	D	—	Water very irony, hard. Softener used.
Aquia	10	20	4/6/51	J,E	30	4/6/51	3.0	D	—	See driller's log.
do	10	25	12/8/50	J,E	20	12/8/50	1.3	D	—	Water reported fair. See driller's log.
do	15	23	4/5/51	J,E	15	4/5/51	1.9	D	—	Water reported slightly hard.
do	15	20	7/13/51	C,E	20	7/13/51	4.0	D,F	—	Water reported good. See driller's log.
do	11	22	4/30/53	C,E	25	4/30/53	2.3	D	—	Water reported good.
do	12	24	9/3/53	J,E	25	9/3/53	2.0	D	—	Water reported good. See driller's log.
do	12	21	9/3/53	J,E	20	9/3/53	2.2	D,F	—	Water reported hard, irony. See driller's log.
Magothy(?)	—	—	—	N	50	1907(?)	—	N	—	Water reported good. Well abandoned years ago; exact location unknown. See driller's log.
Aquia	—	—	—	—,E	—	—	—	D	52.5	See chemical analyses.
do	46	55	1/9/52	C,E	30	1/9/52	3.3	D	60	Water reported hard, cloudy. Reported depth, 235 feet. Static level 45 ft. 7/2/53. See driller's log.
do	51	70	9/15/52	J,E	55	9/15/52	2.8	D	—	Water reported good. See driller's log.
do	22	40	3/10/52	J,E	30	3/10/52	1.6	D	—	Do
do	—	—	—	J,E	—	—	—	D	—	Water reported good.
do	40	50	8/–/50	J,E	20	8/–/50	2.0	D	—	Do
do	55	62	8/21/50	J,E	12	8/21/50	1.4	D,F	—	Water reported good. See driller's log.
do	40	48	1/30/53	J,E	10	1/30/53	1.2	D	—	Do
do	31	60	7/–/50	T,E	160	7/–/50	5.5	C	—	Water used for washing gravel and sand. See driller's log.
do	52	57	4/12/46	J,E	20	4/12/46	4.0	D	—	Water reported good. See driller's log.
Matawan-Monmouth	18	78	8/5/48	T,E	220	8/5/48	3.6	D,F	—	Field test: Fe 0.0 ppm, H 170 ppm, pH 8.5. See driller's log and chemical analysis.
Wicomico	18	—	7/13/53	C,E	—	—	—	D,F	—	Water reported good.
do	16	—	7/13/53	C,E	—	—	—	D,F	—	Do
do	18	—	7/13/53	C,E	—	—	—	F	—	Do
do	22	—	7/13/53	C,E	—	—	—	D	—	Do
Aquia	73	85	8/3/53	J,E	10	8/3/53	.8	D	—	Water reported good. Well reported sealed at 75 ft. See driller's log.
do	47	65	8/3/53	J,E	10	8/3/53	.5	D,F	—	Water reported good. See driller's log.
do	7	21	8/3/53	J,E	20	8/3/53	1.4	D,F	—	Do
do	14	—	8/25/53	C,E	—	—	—	D,F	—	Water reported good.
do	18	—	8/26/53	C,E	—	—	—	D,F	—	Do
Wicomico	10	—	8/26/53	C,H	—	—	—	D,F	—	Do
do	14	—	8/26/53	C,E	—	—	—	D	—	Do
do	14	—	8/26/53	C,H	—	—	—	F	—	Do
do	7.70^{m}	—	8/26/53	—	—	—	—	—	—	Water reported good. Fire protection.
Aquia	53	60	4/—/51	J,E	20	4/—/51	2.8	D	—	Water reported slightly irony. See driller's log.
Eocene series	38	44	5/24/50	J,E	10	5/24/50	1.6	D,F	—	Do

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
De 3	Walter Pippin	M. A. Pentz	1953	59	Driven	251	4	107	0
De 4	Harry Duffy	do	1947	50	do	202	4	160	0
De 5	Jackson R. Collins	—	1903	55	Driven	30+	2½	—	—
De 6	C. S. Thomas	Kennard Thomas(?)	1940	65	Drilled	—	—	—	—
De 7	Jack Cannon	—	1900	45	Dug	37	48	—	—
De 8	Julian Butler	—	1900	65	do	35	66	—	—
De 9	Charles E. Quimby	—	1900	61	do	11	48	—	—
De 10	Kennard Thomas	—	1900	62	do	25	48	—	—
De 11	Theodore Fletcher	—	1937	60	Drilled	135	4	—	—
De 12	Sudler Tolson	—	1900	67	Dug	25	48	—	0
De 13	Julian Butler	—	1900	65	do	30	66	—	—
De 14	Charles P. Arrington	—	1900	42	do	25	54	—	—
De 15	Bill Jacobs	—	1900	67	do	27	54	—	—
De 16	Do	—	1900	65	do	30	54	—	—
De 17	Do	—	1900	65	do	31	54	—	—
De 18	Mrs. Linda Richardson	—	1900	60	do	32	54	—	—
De 19	Mrs. Gladys Keith	—	1924	62	Drilled	326	3	—	—
De 20	Charles F. Quimby	—	1900	71	Dug	27	48	—	—
De 21	Do	—	1900	71	do	28	48	—	—
De 22	Mrs. Frank Harper	—	1900	75	do	30	48	—	—
De 23	Do	—	—	75	Driven	30	1½	—	—
De 24	J. E. Chanes	A. W. Hudson	1953	42	Drilled	210	2½-1½	189	0
De 25	John Leekley	—	1900	42	Dug	20	48	—	—
De 26	Col. Hutchinson	—	—	48	do	22	54	—	—
De 27	Town of Centreville	Shannahan Artesian Well Co.	1899	15	Drilled	530	10	361	30
De 28	Do	do	1915	15	do	480(?)	8	—	—
Df 1	G. W. Neighbors	Ennis Brothers	1952	60	do	285	4	97.5	0
Df 2	Harry Jump	—	1925	68	Driven	30	1½	—	—
Df 3	Joe Eaton	John States	1950	65	Drilled	194	2½	160	0
Df 4	Mrs. Gladys Keith	—	1900	77	Dug	35	48	—	—
Df 5	Alex Dodd	—	1900	67	do	28	48	—	—
Df 6	Ann Jackobs	—	1900	75	do	22	60	—	—
Df 7	H. Aldy Dean	—	1933	69	Drilled	250	6	—	—
Df 8	Mrs. Herbert Everett	—	1880	72	Dug	30	54	—	—
Df 9	Oscar Sparks	—	1946	68	Driven	25	1½	—	—
Df 10	Bill Jackobs	—	1900	67	Dug	19	72	—	—
Df 11	Wm. T. Capell	—	1900	60	do	22	54	—	—
Df 12	Do	—	—	62	Driven	25	1½	—	—
Df 13	E. Leon Massey	—	1900	62	Dug	22	48	—	—
Df 14	H. Aldy Dean, Sr.	—	1900	54	do	25	48	—	—
Df 15	Mrs. Octave Merrick	—	1952	48	Driven	22	1½	—	—
Df 16	Wm. W. Redden	—	1900	55	do	22	1½	—	—
Df 17	Thomas T. Mitchell	—	1946	50	do	18	1½	—	—
Df 18	F. Bennett Carter	M. A. Pentz	1951	67	Drilled	318	4	100	0
Df 19	Norman Mason	—	1900	40	Driven	40	1½	—	—
Df 20	Edward Callahan	—	1900	48	Dug	30	48	—	—
Df 21	W. R. Wilson II	—	1900	49	do	22	54	—	—
Df 22	Olin Blunt	—	1928	60	Driven	20	2	—	—
Df 23	Wm. B. Dean	—	1900	65	Dug	16	54	—	—
Df 24	Do	—	1900	65	do	18	54	—	—

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gal per min.	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Aquia	57	75	9/2/53	J,E	40	9/2/53	2.2	D	56	See driller's log and chemical analysis.
do	59	63	11/28/49	J,E	10	11/28/49	2.5	D,F	—	See driller's log.
Wicomico	9-10	—	7/10/53	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	F	—	Do
do	18	—	7/14/53	C,E	—	—	—	D,F	—	Do
do	25	—	7/16/53	J,E	—	—	—	F	—	Do
do	7.20m	—	7/16/53	C,H	—	—	—	D	—	Water very poor.
do	15	—	7/17/53	C,E	—	—	—	D,F	—	Water reported good.
Calvert(?)	—	—	—	C.E	—	—	—	D,F	—	Do
Wicomico	16	—	7/17/53	C,E	—	—	—	D,F	52	See chemical analysis.
do	23	—	7/16/53	J,E	—	—	—	D	—	Water reported good.
do	18	—	7/20/53	C,E	—	—	—	D,F	—	Do
do	20	—	7/20/53	C,H	—	—	—	D	—	Do
do	23	—	7/20/53	C,E	—	—	—	D,F	—	Do
do	24	—	7/20/53	C,E	—	—	—	D,F	—	Do
do	22.30m	—	7/20/53	C,H	—	—	—	D,F	—	Do
Aquia	—	—	—	C,E	—	—	—	D,F	—	Do
Wicomico	19	—	7/24/53	C,H	—	—	—	D	—	Do
do	20	—	7/24/53	C,E	—	—	—	F	—	Do
do	20	—	7/27/53	C,E	—	—	—	D	—	Do
do	20	—	7/27/53	C,E	—	—	—	F	—	Do
Aquia	40	55	8/3/53	J,E	20	8/3/53	1.3	D	—	Water reported good. See driller's log.
Wicomico	16	—	8/25/53	C,E	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do
Monmouth	17	49	4/6/55	T,E	750	4/6/55	23.4	P	—	Yield from 366-391 ft. See driller's log and chemical analysis.
do	22	48	1915(?)	T,E	500	1915(?)	19.2	P	—	See driller's log and chemical analysis.
Aquia	7.6	49.9	4/8/52	—,E	40	4/8/52	0.9	F	—	Some iron reported. See driller's log.
Wicomico	17	—	7/15/53	C,E	—	—	—	D,F	—	Water reported good.
Eocene series	12	—	7/15/53	J,E	—	—	—	D,F	—	Do
Wicomico	16	—	7/15/53	J,E	—	—	—	D,F	—	Do
do	18	—	7/15/53	C,E	—	—	—	D,F	—	Do
do	16	—	7/53	C,E	—	—	—	D,F	—	Do
Eocene series	—	—	7/16/53	J,E	—	—	—	D,F	—	Do
Wicomico	16	—	7/16/53	J,E	—	—	—	D	—	Do
do	16	—	7/16/53	C,H	—	—	—	C	—	Do
do	13	—	7/17/53	C,E	—	—	—	D,F	—	Do
do	15	—	7/20/53	C,E	—	—	—	D	—	Do
do	17	—	7/20/53	C,E	—	—	—	F	—	Do
do	15	—	7/20/53	C,E	—	—	—	D,F	—	Do
do	17	—	7/20/53	J,E	—	—	—	D,F	—	Do
do	14	—	7/20/53	C,E	—	—	—	D,F	—	Do
do	13	—	7/21/53	C,E	—	—	—	D,F	—	Do
do	10	—	7/20/53	C,E	—	—	—	D,F	—	Do
Aquia	—	—	—	J,E	—	—	—	F	—	Do
Wicomico	—	—	—	S,E	—	—	—	D,F	—	Do
do	23.5	—	7/21/53	C,E	—	—	—	D,F	—	Do
do	13.0m	—	7/21/53	C,E	—	—	—	D,F	—	Do
do	—	—	—	J,E	—	—	—	D,F	—	Do
do	11.60m	—	7/22/53	C,E	—	—	—	F	—	See chemical analysis.
do	11.20m	—	7/22/53	C,H	—	—	—	D	—	Water reported good.

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Df 25	Wm. P. Dean	—	1900	68	Dug	19	48	—	—
Df 26	Thomas J. Cooke	—	1900	65	do	27	48	—	—
Df 27	Do	—	1900	65	do	26	54	—	—
Df 28	Webster Moore	—	1900	50	do	22	54	—	—
Df 29	Do	—	1900	43	do	22	54	—	—
Df 30	James B. Bright	—	—	60	Driven	35	1½	—	—
Df 31	Mrs. James Quimby	—	1900	69	Dug	24	54	—	—
Df 32	Edwin Meredith	—	1900	70	do	25	54	—	—
Df 33	John S. Kimbles	—	1948	70	Driven	35	1½	—	—
Df 34	Helen West	—	1900	63	Dug	35	60	—	—
Df 35	Do	—	1900	63	do	30	60	—	—
Df 36	Wm. H. Cook	—	1900	68	do	30	54	—	—
Df 37	Lloyd Andrew	—	1928	70	Driven	25	2	—	—
Df 38	Luther Downes	—	1900	74	Dug	30	48	—	—
Df 39	R. Wilson Leager	—	—	70	do	30	48	—	—
Df 40	H. F. Callahan	—	—	73	Driven	30	1½	—	—
Df 41	Baton Connolly	—	1900	74	Dug	30	48	—	—
Df 42	Do	—	1900	74	do	28	48	—	—
Df 43	Mrs. Annie Merrick	—	1948	80	Drilled	—	—	—	—
Df 44	Bernard Merrick	—	1900	68	Dug	25	54	—	—
Df 45	Do	—	1900	68	do	27	54	—	—
Df 46	Mrs. C. S. Thomas	—	1900	68	do	24	48	—	—
Df 47	John W. Nelson	—	—	64	Driven	24	1½	—	—
Df 48	Milford Usilton	—	1900	69	Dug	24	48	—	—
Df 49	Samuel Blunt	—	1947	68	Driven	27	1½	—	—
Df 50	Wm. J. Emerson	—	1952	68	do	22	1½	—	—
Df 51	Oscar Chambers	—	1900	69	Dug	30	48	—	—
Dg 1	Charles P. Donville	—	1900	43	Driven	25	1½	—	—
Dg 2	Albert D. Warren	—	1900	62	Dug	22	48	—	—
Dg 3	Mrs. Edna Biddle	—	1900	46	Driven	22	1½	—	—
Dg 4	Miss Mary Downes	—	1900	55	Dug	30	48	—	—
Dg 5	John Ashley	—	—	46	Driven	35	2	—	—
Dg 6	Dolly Callahan	—	1900	60	Dug	27	48	—	—
Dg 7	Dulin Clark	—	1951	66	Driven	22	1½	—	—
Dg 8	Howard Ryland	—	1900	50	Dug	26	48	—	—
Dg 9	Albert D. Warren	—	1930	62	Driven	22	1½	—	—
Dg 10	Miss Mary Downs	—	1951	55	do	30	1½	—	—
Dg 11	Dulin Clark	—	1900	66	Dug	22	48	—	—
Dg 12	Marshall Downes	—	1900	62	do	27	48	—	—
Dg 13	Wm. Emerson	—	1900	55	do	24	48	—	—
Dg 14	Wm. Kimbles	—	1900	72	do	30	54	—	—
Dg 15	Do	—	1900	72	do	27	48	—	—
Dg 16	Wilson Rash	—	1900	72	do	30	48	—	—
Dg 17	John W. Skinner	—	—	68	Driven	27	1½	—	—
Dg 18	Do	—	—	68	do	27	1½	—	—
Dg 19	Eck & Higgs Co.	—	—	65	do	34	1½	—	—
Dg 20	E. E. Walls, Sr.	—	—	62	do	34	1½	—	—
Dg 21	Charles Brown	—	1900	60	Dug	24	48	—	—
Dg 22	Do	—	—	60	Driven	24	1½	—	—
Dg 23	Leonard Walls	—	—	55	do	30	1½	—	—

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gal. per min.	Date				
Wicomico	12	—	7/22/53	C,E	—	—	—	D,F	—	Water reported good.
do	20	—	7/22/53	C,H	—	—	—	D,F	—	Do
do	19	—	7/22/53	C,E	—	—	—	D,F	—	Do
do	16.5	—	7/22/53	C,E	—	—	—	D,F	—	Do
do	16	—	7/22/53	C,H	—	—	—	D,F	—	Do
do	—	—	—	S,E	—	—	—	D,F	—	Do
do	17	—	7/22/53	?,G	—	—	—	D,F	—	Do
do	17	—	7/22/53	C,E	—	—	—	D,F	—	Do
do	—	—	—	S,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	22	—	7/22/53	C,E	—	—	—	D,F	—	Do
do	17	—	7/24/53	J,E	—	—	—	D,F	—	Do
do	20	—	7/27/53	C,E	—	—	—	D,F	—	Water reported irony. Inadequate supply.
do	23	—	7/27/53	J,E	—	—	—	D,F	—	Water reported good.
do	20	—	7/27/53	C,E	—	—	—	D,F	—	Do
do	20	—	7/27/53	C,E	—	—	—	D	—	Do
do	20	—	7/27,53	C,E	—	—	—	F	—	Do
—	—	—	—	S,E	—	—	—	D,F	—	Do
Wicomico	17	—	7/28/53	C,H	—	—	—	D	—	Do
do	20	—	7/28/53	C,E	—	—	—	F	—	Do
do	17	—	7/28/53	C,H	—	—	—	D,F	—	Do
do	18	—	7/28/53	C,E	—	—	—	D,F	—	Do
do	17	—	7/28/53	C,E	—	—	—	D,F	—	Do
do	17	—	7/30,53	C,E	—	—	—	D,F	—	Do
do	12	—	7/30,53	C,E	—	—	—	D,F	—	Water reported good. Inadequate supply.
do	20	—	7/30/53	C,E	—	—	—	D,F	—	Water reported good.
do	15	—	7/21/53	J,E	—	—	—	D,F	—	Do
do	15	—	7/21/53	C,H	—	—	—	D,F	—	Do
do	15	—	7/21/53	C,E	—	—	—	D,F	—	Do
do	22	—	7/21/53	C,H	—	—	—	D	—	Do
do	—	—	—	J,E	—	—	—	D,F	—	Do
do	27	—	7/21/53	S,E	—	—	—	D,F	—	Do
do	15	—	7/21/53	C,E	—	—	—	D,F	—	Do
do	18	—	7/21/53	C,E	—	—	—	D,F	—	Do
do	16	—	7/21/53	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	15	—	7/21/53	C,E	—	—	—	D,F	—	Do
do	20	—	7/28/53	C,E	—	—	—	D,F	—	Do
do	18	—	7/28/53	C,E	—	—	—	D,F	—	Do
do	20	—	7/30/53	C,H	—	—	—	D,F	—	Do
do	20	—	7/30/53	C,G	—	—	—	F	—	Do
do	22	—	7/30/53	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	20	—	7/30/53	C,H	—	—	—	F	—	Water reported good. Inadequate supply.
do	—	—	—	C,H	—	—	—	D	—	Water reported good.
do	—	—	—	C,E	—	—	—	D,F	—	Do

TABLE 47

Well number QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Dg 24	Lenard Walls	—	—	55	Driven	30	1½	—	—
Dg 25	Do	—	—	55	do	27	1½	—	—
Dg 26	Marley Brown	—	1900	62	Dug	30	54	—	—
Dg 27	Wm. R. Wilson, Jr.	—	1941	77	Driven	26	1½	—	—
Dg 28	Do	—	1918	77	do	56	1¼	—	—
Dg 29	Nelson Corkell	—	—	77	do	27	1½	—	—
Dg 30	H. E. Smith	—	1943	78	do	20	1½	—	—
Dg 31	Do	—	1943	78	do	20	1½	—	—
Dg 32	Eldridge Downs	—	1900	58	Dug	30	54	—	—
Dg 33	Do	—	1928	58	Driven	30	1½	—	—
Dg 34	B. F. Folker	—	1900	56	Dug	—	48	—	—
Dg 35	Mrs. Fleckinstein	—	1928	47	Driven	27	1½	—	—
Dg 36	Do	—	1928	47	do	26	1½	—	—
Dg 37	Arthur Boyles	—	—	43	do	27	1½	—	—
Dg 38	Do	—	—	43	do	28	1½	—	—
Dg 39	Clifton Elliott	—	—	47	Drilled	180	4	—	—
Dg 40	Mrs. Percy Bittle	—	1928	57	Driven	18	1½	—	—
Ea 1,	Nathan Morris	Wm. Aaron	1946	10	Drilled	204	—	—	—
Ea 2	John J. Anzer	Dodo & Aaron	1936	12	do	208	1½	—	—
Ea 3	J. Charles Paca	Paca	—	20	Driven	42	1½	—	—
Ea 4	Chesapeake Ferry System	Wm. Aaron	1947	5	Drilled	160±	2½	—	—
Ea 5	Do	Shannahan Artesian Well Co.	1930	16	do	639	6	—	—
Ea 6	Mac Gardener	Wm. Aaron	1952	18	do	140	1½	120±	0
Ea 7	Do	do	1952	18	do	140	1½	120	0
Ea 8	Carlin Martin	do	1953	8	do	232	1½	210	0
Ea 9	Bay Side Corporation	do	1952	9	do	155	1½	140	0
Ea 10	Matthew Bean	do	1952	20	do	120	1½	100	0
Ea 11	Charles Baylis	do	1953	20	do	140	1½	120	0
Ea 12	Mitchell Davidson	do	1952	9	do	140	1½	120	0
Ea 13	Mrs. Mollie Grimes	A. W. Hudson	1951	9	do	160	1½	125	0
Ea 14	J. R. Coursey	Wm. Aaron	1951	15	do	200	1½	180	0
Ea 15	Richard Kroeger	A. W. Hudson	1953	12	do	180	1½	147	0
Ea 16	Wm. A. Dillehunt	do	1952	14	do	187	1½	147	0
Ea 17	Do	do	1953	14	do	185	1½	147	0
Ea 18	E. S. Builders Inc.	do	1952	14	do	180	1½	147	0
Ea 19	Andrew Hoffman	Wm. Aaron	1952	15	do	140	1½	120	0
Ea 20	Harold Barshop	do	1951	10	do	180	1½	160	0
Ea 21	Anthony R. Simmel	do	1951	10	do	180	1½	160	0
Ea 22	Mac Gardner	do	1953	20	do	88	1½	69	0
Ea 23	Do	do	1953	20	do	110	1½	90	0
Ea 24	Do	do	1953	20	do	105	1½	—	—
Eb 1	Earnshaw Cook	Wm. Aaron	1950	10	do	200	1½	180	0
Eb 2	J. C. Palmer	A. W. Hudson	1947	18	do	233	1½	189	0
Eb 3	E. Smith	do	1950	18	do	225	1½	190	0
Eb 4	Albert McCoubrey	do	1949	7	do	230	1½	189	0

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gal. per min.	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Wicomico	—	—	—	C,H	—	—	—	D,F	—	Water reported good.
do	—	—	—	C,E	—	—	—	F	—	Do
do	20	—	7/30/53	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	17	—	7/30/53	C,H	—	—	—	D	—	Do
do	17	—	7/30/53	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	20	—	8/7/53	C,H	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,E	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	F	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Do
do	—	—	—	C,H	—	—	—	D	—	Do
Calvert	—	—	—	J,E	—	—	—	D,F	—	Water reported hard, irony.
Wicomico	—	—	—	J,E	—	—	—	D,F	—	Water reported slightly hard.
Aquia	15	—	5/—/46	C(?),H	50	5/—/46	—	D	57	Chloride reported 18 ppm.
do	18	—	1936	C(?),H	—	—	—	D	56	Chloride reported 12 ppm.
Talbot	—	—	—	C(?),H	—	—	—	D,F	—	Chloride reported 22 ppm.
Aquia	8	—	—	C(?),E or N	41.6	—	—	N	—	Test hole for State Park project. See chemical analysis.
Raritan	4.30	—	1930	N	40	1930(?)	—	N	—	Salty and irony water reported at 240 feet. Water irony at 639 feet. See driller's log.
Aquia	12	22	9/12/52	C,E	15	9/12/52	1.5	D	—	Water reported good. See driller's log.
do	13	22	10/19/52	J,E	15	10/19/52	1.7	D	—	Water reported good.
do	2	14	6/27/53	C,H	20	6/27/53	1.6	D	—	Water reported good. Static level 1.44 ft. below land surface, 8/21/53. See driller's log.
do	6	21	9/3/53	C,E	25	9/3/53	1.7	D	—	Water reported good. See driller's log.
do	16	25	7/22/52	C,E	20	7/22/52	2.2	D	54	See chemical analysis.
do	12	22	5/21/53	C,H	14	5/21/53	1.4	D	—	Water reported good. See driller's log.
do	12	22	3/14/52	C,E	15	3/14/52	1.5	D	—	Water reported good.
do	12	17	7/24/51	C,E	15	7/24/51	3.0	D	—	Water reported good. See driller's log.
do	19	25	7/20/51	C,E	20	7/20/51	3.6	D,F	—	Do
do	18	26	1/3/53	C,E	25	1/3/53	3.1	D	—	Do
do	18	29	12/13/52	S,E	20	12/13/52	1.8	D	—	Water rather hard.
do	14	21	5/5/53	C,H	25	5/5/53	3.6	D	—	Water reported good.
do	2	27	12/24/52	C,E	25	12/24/52	1.0	D,C	—	Water reported good. See driller's log.
Eocene series	10	18	3/27/52	C,E	15	3/27/52	1.8	D,F	—	Water reported good.
Aquia	12	22	11/17/51	C,E	20	11/17/51	2.0	D	—	Water reported good. See driller's log.
do	12	22	11/5/51	J,E	15	11/5/51	1.5	D	—	Water reported good.
Aquia(?)	—	—	—	—	—	—	—	D	—	Water reported good. See sample log.
Aquia	18	25	7/31/53	—	15	7/31/53	.9	D	—	Water reported good.
do	18	40	7/24/53	—	10	7/24/53	.5	D	—	Do
Aquia(?)	12	18	10/30/50	T,G	20	10/30/50	3.3	F	—	Water reported good. See driller's log.
Aquia	8	12	6/7/47	J,E	8	6/7/47	2.0	C	—	Garage. See driller's log.
do	8	12	9/6/50	J,E	20	9/6/50	5.0	D	—	Water reported good.
do	12	20	3/19/49	J,E	30	3/19/49	3.7	C	—	Water reported good. Restaurant. See driller's log.

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Eb 5	Dr. Louis V. Glass	Wm. Aaron	1952	6	Drilled	60	2½	—	0
Eb 6	Eastern Corporation	do	1952	15	do	210	1½	190	0
Eb 7	Do	do	1953	15	do	225	4	200	0
Eb 8	Clarke Jewell	do	1951	15	do	210	1½	180	0
Eb 9	Stevensville Volunteer Fire Dept.	A. W. Hudson	1948	8	do	235	1½	194	0
Eb 10	Henry Grollman	Wm. Aaron	1933	20	do	250	1½	—	0
Eb 11	Julius Grollman	A. W. Hudson	—	20	do	225	1½	—	0
Eb 12	Stevensville Volunteer Fire Dept.	—	—	15	do	195	2½	—	0
Eb 13	Edward C. Higgins	W. Baker	1923	20	Dug	11	36	—	0
Eb 14	Solly Grollman	A. W. Hudson	1949	18	Drilled	230	1½	189	0
Eb 15	Presley Reamy	Wm. Aaron	1950	12	do	225	1½	—	0
Eb 16	Melvin Clark	A. W. Hudson	1949	15	do	230	1½	192	0
Eb 17	Louis Crouch	do	1950	15	do	245	1½	205	0
Eb 18	John T. Price	do	1947	10	do	241	1½	205	0
Eb 19	Louis O. Kelley	Wm. Aaron	1952	10	do	210	1½	190	0
Eb 20	Lillian Cockey	do	1951	6	do	210	1½	180	0
Eb 21	Medford Golt	A. W. Hudson	1950	12	do	235	1½	192	0
Eb 22	Pennsylvania R.R.	—	—	17	—	224	2	—	0
Eb 23	James Ewing	Wm. Aaron	1952	17	Drilled	210	1½	190	0
Eb 24	Johnson & Stevens	A. W. Hudson	1950	17	do	210	1½	180	0
Eb 25	Hugh Harris	Wm. Aaron	1946	17	do	224	1½	198	0
Eb 26	Cleve Thomas	A. W. Hudson	1950	17	do	210	1½	179	0
Eb 27	Kennard Harris	Wm. Aaron	1946	17	do	225	1½	201	0
Eb 28	Hill Hoxter	A. W. Hudson	1947	16	do	198	1½	160	0
Eb 29	John Legg	do	1949	16	do	200	1½	167	0
Eb 30	Oliver Legg	do	1950	16	do	200	1½	167	0
Eb 31	C. & P. Telephone Co.	M. A. Pentz	1949	8	do	220	2½	190	0
Eb 32	Stevensville High School	A. W. Hudson	1951	16	do	235	2½	189	0
Eb 33	Town of Stevensville	W.P.A.	—	15	do	200	2½	—	0
Eb 34	Kent Motor Hotel	Wm. Aaron	1953	18	do	210	4	120	0
Eb 35	David M. Nichols & Co.	do	1953	10	do	215	1½	190	0
Eb 36	Do	do	1952	10	do	210	1½	190	0
Eb 37	Do	do	1952	10	do	210	1½	190	0
Eb 38	Do	do	1952	10	do	210	1½	190	0
Eb 39	Do	do	1952	17	do	200	1½	160	0
Eb 40	Do	A. W. Hudson	1951	17	do	200	1½	189	0
Eb 41	Wm. Wyatt	Wm. Aaron	1951	10	do	215	1½	180	0
Eb 42	Orville Nash	A. W. Hudson	1950	10	do	210	1½	180	0
Eb 43	Edward Nash	do	1953	10	do	220	1½	180	0
Eb 44	Mrs. J. Nash	do	1952	10	do	220	1½	175	0
Eb 45	Crane & Crane	do	1952	10	do	210	1½	175	0
Eb 46	Alvin Tolson	do	1949	17	do	220	1½	185	0
Eb 47	Lee G. Bell	do	1948	17	do	215	1½	171	0
Eb 48	Crain Highway Corporation	do	1951	9	do	215	2½	178	0
Eb 49	Earl Kelly	do	1948	17	do	215	1½	178	0
Eb 50	Wm. Schultz	do	1952	17	do	220	1½	178	0
Eb 51	Hiram Lewis	do	1951	17	do	215	1½	170	0
Eb 52	Wm. Harris	do	1953	16	do	235	1½	196	0
Eb 53	Lawrence Chance	do	1952	16	do	220	1½	189	0
Eb 54	Mrs. Alice Jones	do	1952	16	do	220	1½	189	0
Eb 55	R. Cornish	do	1952	16	do	220	1½	189	0

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gal. per min.	Date				
Talbot	15	25	4/5/52	C(?),H	20	4/5/52	2.0	D	—	Water reported irony. See driller's log.
Aquia	12	20	9/20/52	C,E	20	9/20/52	2.5	C	—	Water reported good. Gas station. See driller's log.
do	9	60	1/13/53	T,E	125	1/13/53	2.4	C	—	Water reported hard. Motel and shopping center. See driller's log.
do	10	21	11/10/51	C,E	20	11/10/51	1.8	D	—	See driller's log.
do	7	11	4/24/48	C,E	8	4/24/48	2.0	P	—	Water reported good.
do	—	—	—	C,E	—	—	—	D	—	Do
do	9.89^{m}	—	2/10/53	C,H	—	—	—	D	—	Do
do	2.65^{m}	—	2/10/53	N	—	—	—	N	—	Observation well.
Talbot	2.75^{m}	—	2/10/53	C,E	—	—	—	D	—	Water reported good.
Aquia	14	20	6/14/49	J,E	20	6/14/49	3.3	D	—	Do
do	14	20	9/11/50	C,E	20	9/11/50	3.3	D	—	Do
do	12	20	10/10/49	C,H	20	10/10/49	2.5	D	—	Water reported good. Static level 11.96 ft. below land surface, 2/10/53.
do	12	18	3/9/50	C,E	33	3/9/50	5.5	D	—	Water reported good.
do	3	10	4/24/47	J,E	30	4/24/47	4.2	D	—	Water reported good. See driller's log.
do	4	14	9/12/52	C,E	25	9/12/52	2.5	D	—	Water reported good.
do	9	14	7/24/51	?,E	20	7/24/51	4.0	D	—	
do	10	15	7/1/50	C,E	30	7/1/50	6.0	D	—	Water reported very hard.
do	8.43^{m}	—	2/11/53	N	—	—	—	N	—	
do	12	20	8/6/52	C,E	20	8/6/52	2.5	C	—	Water reported good. See driller's log.
do	12	18	5/4/50	C,E	10	5/4/50	1.6	D	—	Water reported good.
do	12	14	10/18/46	C,E	25	10/18/46	12.5	D	—	Water reported good. See driller's log.
do	10	25	7/30/50	C,E	25	7/30/50	1.6	D	—	Water reported good.
do	14	16	10/22/46	C,H	20	10/22/46	10.0	D	—	Do
do	10	15	8/2/47	C,H	30	9/2/47	6.0	D	—	Do
do	15	20	4/9/49	J,E	30	4/9/49	6.0	D	—	Water reported hard.
do	12	18	8/15/50	C,E	20	8/15/50	3.3	D	—	Water reported good.
do	12	25	4/23/49	J,E	30	4/23/49	2.3	D	—	Do
do	15	25	1/6/51	J,E	30	1/6/51	3.0	P,S	—	Do
do	—	—	—	N	—	—	—	N	—	
do	12	26	4/30/53	J,E	50	4/30/53	3.5	C	—	Water reported good. See driller's log.
do	6	20	3/14/53	J,E	20	3/14/53	1.4	D	—	Do
do	12	20	10/21/52	C,E	20	10/21/52	2.5	D	—	Water reported good.
do	14	22	10/21/52	C,E	15	10/21/52	1.8	D	—	Do
do	10	22	10/28/52	C,E	20	10/28/52	1.6	D	—	Water reported good. See driller's log.
do	5	14	8/28/52	C,H	15	8/28/52	1.6	D	—	Water reported irony.
do	13	23	5/11/51	J,E	20	5/11/51	2.0	D,F	—	Water reported good. See driller's log.
do	14	21	9/22/51	C,E	20	9/22/51	2.9	D	—	Water reported good.
do	8	14	10/20/50	C,E	25	10/20/50	4.1	D	—	Water reported good. See driller's log.
do	8	19	5/12/53	C,H	25	5/12/53	2.2	D	—	Water reported good.
do	10	18	10/3/52	C,E	25	10/3/52	3.1	D	—	Do
do	10	18	5/12/52	C,E	25	5/12/52	3.1	D	—	Water reported good. See driller's log.
do	14	20	5/7/49	C,E	20	5/7/49	3.3	D	—	Water reported good.
do	15	18	5/26/48	C,E	8	5/26/48	2.6	D	—	Do
do	8	18	4/28/51	J,E	40	4/28/51	4.0	D	—	Water reported good. See driller's log.
do	12	14	2/18/48	C,E	20	2/18/48	10.0	D	—	Water reported good.
do	15	20	5/16/52	J,E	25	5/16/52	5.0	D	—	Do
do	12	25	9/24/51	C,H	20	9/24/51	1.5	D	—	Do
do	8	15	4/13/53	C,E	25	4/13/53	3.5	D	—	Do
do	12	23	8/29/52	C,E	25	8/29/52	2.2	D	—	Water reported good. See driller's log.
do	12	23	8/18/52	C,E	25	8/18/52	2.2	D	—	Water reported good.
do	8	17	2/18/52	C,E	20	2/18/52	2.2	D	—	Do

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Eb 56	Carl Pinkett	A. W. Hudson	1953	16	Drilled	230	1½	210	0
Eb 57	Edgar Sullivan	do	1951	16	do	220	1½	190	0
Eb 58	Thomas E. Collison	Wm. Aaron	1952	15	do	210	1½	190	0
Eb 59	Wm. Lewis	do	1952	15	do	210	1½	180	0
Eb 60	John Schultz	A. W. Hudson	1952	15	do	225	1½	189	0
Eb 61	James Thomas	Wm. Aaron	1951	15	do	210	1½	185	0
Eb 62	Edgar Wyatt	do	1946	15	do	200	1½	180	0
Eb 63	Paul Coleman	A. W. Hudson	1952	16	do	240	1½	205	0
Eb 64	Emory Wyatt	Wm. Aaron	1952	10	do	220	1½	200	0
Eb 65	Myrtle Coleman	A. W. Hudson	1953	4	do	238	1½	198	0
Eb 66	Whitefield Coleman	Wm. Aaron	1953	9	do	210	1½	185	0
Eb 67	Frank Lewis	do	1951	10	do	200	1½	200	0
Eb 68	Arnold Thomas	do	1953	9	do	235	1½	220	0
Eb 69	Lemuel Thompson	do	1952	9	do	260	1½	250	0
Eb 70	Ira Stevens	do	1951	9	do	225	1½	210	0
Eb 71	Norman Gardner	do	1951	9	do	250	1½	225	0
Eb 72	H. L. Martin	A. W. Hudson	1950	9	do	265	1½	225	0
Eb 73	Edgar Jones	A. Bailey	1948	9	do	225	1½	205	0
Eb 74	Carl Senft	Wm. Aaron	1952	9	do	220	1½	200	0
Eb 75	Roe & Cox	A. W. Hudson	1952	9	do	272	1½	230	0
Eb 76	Gilmore Green	do	1952	13	do	240	1½	210	0
Eb 77	H. T. Hopkins	Wm. Aaron	1950	12	do	210	1½	190	0
Eb 78	Wm. E. Denny	A. W. Hudson	1951	13	do	225	1½	190	0
Eb 79	Harry Green	Wm. Aaron	1951	14	do	235	1½	210	0
Eb 80	David Jones	do	1953	11	do	225	1½	205	0
Eb 81	Mrs. J. C. Jones	do	1951	11	do	252	1½	232	0
Eb 82	Miss Beatrice Jones	do	1950	11	do	242	1½	230	0
Eb 83	Emma Dadds	A. W. Hudson	1952	7	do	210	1½	178	0
Eb 84	Marling Farms	do	1952	9	do	275	1½	225	0
Eb 85	Wm. Smouse	do	1952	10	do	280	1½	233	0
Eb 86	J. Gordon Mueller	do	1953	9	do	280	1½	235	0
Eb 87	Marling Farms	do	1953	11	do	283	1½	240	0
Eb 88	E. S. Adkins Co.	do	1953	10	do	283	1½	245	0
Eb 89	J. Gordon Mueller	do	1953	9	do	280	1½	235	0
Eb 90	Earle Seward	do	1953	9	do	283	1½	245	0
Eb 91	Marling Farms	do	1953	9	do	280	1½	255	0
Eb 92	Augustin Palmer	do	1949	16	do	200	1½	170	0
Eb 93	J. D. Sparks	Wm. Aaron	1952	16	do	210	1½	190	0
Eb 94	Do	do	1951	8	do	225	1½	195	0
Eb 95	Elizabeth Timm	A. W. Hudson	1949	16	do	210	1½	170	0
Eb 96	Clara Hill	Wm. Aaron	1952	9	do	220	1½	200	0
Eb 97	Roy Golt	Wm. Aaron	1951	9	do	245	1½	220	0
Eb 98	Do	do	1951	9	do	245	1½	220	0
Eb 99	Do	do	1951	9	do	235	1½	215	0
Eb100	Walter Clough	do	1952	9	do	220	1½	—	0
Eb101	Marvin Thompson	A. W. Hudson	1951	9	do	255	1½	222	0
Eb102	Frank Taylor	do	1951	7	do	225	1½	183	0
Eb103	Percy Stallings	Wm. Aaron	1945	12	do	200	1½	160	0
Eb104	R. E. Packham	A. Bailey	1950	7	do	220	1½	195	0
Eb105	Leonard Risley	A. W. Hudson	1948	7	do	215	1½	180	0
Eb106	Franklin Orth	do	1952	7	do	215	1½	178	0
Eb107	Wm. Rada	Wm. Aaron	1953	10	do	200	1½	—	0

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gal. per min.	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Aquia	14	22	2/16/53	C,H	15	2/16/53	1.8	D	—	Wate reported good.
do	8	15	11/15/51	C,H	20	11/15/51	2.8	D	—	Do
do	15	24	7/18/52	C,H	20	7/18/52	2.2	D	—	
do	5	14	10/10/52	C,E	20	10/10/52	2.2	D	—	Do
do	12	21	8/9/52	C,H	25	8/9/52	2.7	D	—	Water reported poor, irony.
do	12	18	2/5/51	C,E	20	2/5/51	3.3	D	—	Water reported good.
do	12	14	7/20/46	C,E	10	7/20/46	5.0	D	—	Water reported good. See driller's log.
do	12	20	7/28/52	C,E	25	7/28/52	3.1	D	—	Water reported good.
do	7	19	4/16/52	J,E	27	4/16/52	2.2	D	—	Do
do	8	15	4/16/53	C,E	25	4/16/53	3.6	D	—	Do
do	8	21	5/8/53	C,E	25	5/8/53	1.9	D	—	Do
do	17	23	10/5/51	C,E	15	10/5/51	2.5	D	—	Do
do	3	9	2/23/53	C,E	15	2/23/53	2.5	D	—	Do
do	3	15	6/12/52	J,E	23	6/12/52	1.9	D	—	See driller's log.
do	10	18	5/1/51	C,E	20	5/1/51	2.5	D	—	Water reported fairly hard. See driller's log.
do	16	22	10/10/51	C,E	18	10/10/51	3.0	D	—	Water reported good. See driller's log.
do	9	19	10/9/50	C,E	25	10/9/50	2.5	D	—	See driller's log.
do	15	22	4/24/48	C,E	10	4/24/48	1.4	D	—	Water reported good.
do	8	14	8/2/52	C,E	15	8/2/52	2.5	D	—	Do
do	4	12	9/18/52	C,E	25	9/18/52	3.1	D	—	Do
do	10	20	2/7/52	C,E	20	2/7/52	2.0	D	—	Water reported good. See driller's log.
do	10	18	10/23/50	C,E	20	10/23/50	2.5	D	—	Water reported somewhat hard. See driller's log.
do	15	25	9/8/51	C,E	25	9/8/51	2.5	D	—	Water reported good.
do	12	20	4/10/51	S,E	25	4/10/51	3.1	D	—	See driller's log.
do	12	20	3/20/53	C,E	20	3/20/53	2.5	D	—	Water reported good.
do	12	19	7/28/51	C,E	25	7/28/51	3.5	D	—	Water reported good. See driller's log.
do	12	19	10/26/50	C,E	25	10/26/50	3.5	D	—	Water reported good.
do	4	10	7/18/52	C,H	25	7/18/52	4.1	D	—	Do
do	8	14	5/27/52	C,E	25	5/27/52	4.1	D	—	Do
do	8	17	11/18/52	C,E	25	11/18/52	2.7	D	—	See driller's log.
do	8	17	3/25/53	C,E	25	3/25/53	2.7	D	—	Water reported good.
do	10	20	3/20/53	C,E	25	3/20/53	2.5	D	—	Do
do	16	24	2/10/53	C,H	25	2/10/53	3.1	D	—	Water reported good. See driller's log.
do	13	23	6/9/53	C,E	25	6/9/53	2.5	D	—	Water reported good.
do	14	21	4/2/53	C,E	25	4/2/53	3.5	D	—	Do
do	8	15	6/19/53	C,E	25	6/19/53	3.5	D	—	Water reported good. See driller's log.
do	15	20	8/4/49	J,E	20	8/4/49	4.0	D	—	Water reported good.
do	5	—	10/7/52	C,H	—	—	—	D	—	Do
do	9	15	3/25/51	J,E	25	3/25/51	4.1	D	—	Do
do	12	18	10/30/49	C,H	20	10/30/49	3.3	D	—	Do
do	12	22	8/11/52	C,E	15	8/11/52	1.5	D	—	Do
do	11	16	9/27/51	C,E	20	9/27/51	4.0	D	—	See driller's log.
do	10	16	10/2/51	C,H	20	10/2/51	3.3	D	—	
do	1.5	10	10/19/51	C,H	20	10/19/51	2.3	D	—	Water reported good.
do	12	22	10/22/52	C,E	15	10/22/52	1.5	D	—	Do
do	10	20	8/20/51	C,E	25	8/20/51	2.5	D	—	Water reported good. See driller's log.
do	7	15	8/28/51	C,E	25	8/28/51	3.1	D	—	Water reported good.
do	11	15	9/1/45	C,H	20	9/1/45	5.0	D	—	Do
do	7	10	9/9/50	C,E	20	9/9/50	6.8	D	—	Water reported slightly hard.
do	3	9	10/16/48	C,E	20	10/16/48	3.3	D	—	Water reported good. See driller's log.
do	4	12	11/4/52	C,H	25	11/4/52	3.1	D	—	Water reported good.
do	8	26	7/4/53	J,E	20	7/4/53	1.1	D	—	

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Eb108	Harvey Gardner	Wm. Aaron	1953	10	Drilled	205	1½	—	0
Ec 1	State Roads Commission	—	1948	20	Driven	21	1¼	—	—
Ec 2	Norman Pierson	A. Bailey	1949	18	Drilled	231	1½	215	0
Ec 3	Apsley Coleman	A. W. Hudson	1948	18	do	240	1½	215	0
Ec 4	Harford Young	do	1951	18	do	245	1½	200	0
Ec 5	Grace Collier	do	1952	16	do	245	1½	215	0
Ec 6	Richard Thompson	A. Bailey	1948	5	do	240	1½	—	0
Ec 7	Sadler Clevenger	Wm. Aaron	1950	6	do	245	1½	230	0
Ec 8	Benjamin Austin	A. Bailey	1950	6	do	225	1½	200	0
Ec 9	Herbert Long	A. W. Hudson	1948	6	do	230	1½	192	0
Ec 10	Ray Coursey, Jr.	M. Harrison	1946	5	do	210	1½	190	0
Ec 11	Do	A. W. Hudson	1947	6	do	230	1½	193	0
Ec 12	Lawrence Quinn	A. Bailey	1949	15	do	240	1½	—	0
Ec 13	Seventh Day Adventists Church	A. W. Hudson	1952	17	do	236	1½	199	0
Ec 14	Vernon Haddaway	do	1950	5	do	222	1½	185	0
Ec 15	Milton Pierson	do	1952	5	do	225	1½	189	0
Ec 16	Mrs. Edith Baker	do	1952	5	do	225	1½	189	0
Ec 17	Lemuel Gardner	do	1952	6	do	230	1½	191	0
Ec 18	Preston Ruth	do	1951	10	do	230	1½	190	0
Ec 19	Ernest Smith	do	1948	5	do	225	1½	189	0
Ec 20	Henry Reese	do	1952	2	do	260	1½	225	0
Ec 21	Methodist Church	do	1952	12	do	245	1½	210	0
Ec 22	Alfonzo Thomas	do	1951	10	do	235	1½	—	0
Ec 23	D. Tarbuck	Wm. Aaron	1951	7	do	225	1½	200	0
Ec 24	Lester Gardener	A. W. Hudson	1951	6	do	230	1½	200	0
Ec 25	Robert A. Walters	Wm. Aaron	1946	16	do	300	1½	280	0
Ec 26	Claude Lloyd	A. W. Hudson	1948	5	do	227	1½	189	0
Ec 27	C. C. Foster	do	1952	7	do	225	1½	189	0
Ec 28	J. I. Billingham	do	1952	8	do	225	1½	189	0
Ec 29	Joseph Stacks	do	1953	7	do	230	1½	193	0
Ec 30	Monroe O'Donnel	do	1953	8	do	225	1½	189	0
Ec 31	Herman Thompson	do	1952	8	do	225	1½	189	0
Ec 32	H. M. Grief	do	1953	8	do	225	1½	—	0
Ec 33	Lizzie O'Donnell	Wm. Aaron	1945	9	do	245	1½	220	0
Ec 34	Frank Binford	A. W. Hudson	1952	2	do	255	1½	210	0
Ec 35	Margaret Perry	do	1947	7	do	233	1½	196	0
Ec 36	Mr. Volz	A. Bailey	1947	2	do	220	1½	—	0
Ec 37	Henry Mieke	A. W. Hudson	1950	6	do	225	1½	189	0
Ec 38	Howard Todd	Wm. Aaron	1952	16	do	290	1½	—	0
Ec 39	N. P. Corkran	do	1951	4	do	200	1½	180	0

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Water-bearing formation	Water level (feet below land surface)			Pump-ing qeuip-ment	Yield		Specific capac-ity (g.p.m./ft.)	Use of water	Tem-pera-ture (°F.)	Remarks
	Static	Pump-ing	Date		Gal. per min.	Date				
Aquia	6	25	10/6/53	C,—	30	10/6/53	1.6	D	60	See driller's and sample logs.
Talbot	4.74 m	—	7/5/56	N	—	—	—	N	—	Observation well.
Aquia	18	20	5/27/49	C,E	15	5/27/49	7.5	D	—	Water reported good. See driller's log.
do	15	20	10/25/48	C,E	30	10/25/48	6.0	D	—	Water reported hard, slightly irony. See driller's log.
do	8	19	12/30/51	C,H	20	12/30/51	1.9	D	60	Water reported good.
do	12	18	10/1/52	C,H	25	10/1/52	4.1	D	58	Water reported good. Static level 7.22 ft. below land surface, 6/22/53.
do	8	12	8/17/48	C,E	12	8/17/48	3.0	D	—	Water reported hard.
do	12	18	11/5/50	C,E	20	11/5/50	3.3	D	—	Water reported good. See driller's log.
do	6	9	8/5/50	J,E	17	8/5/50	5.7	D	59.5	Water reported slightly hard.
do	12	18	12/2/48	C,E	25	12/2/48	4.1	D	—	Water reported slightly hard. See driller's log.
do	—	11	7/-/46	C,E	8	7/-/46	.7	D	—	Water reported good. Static water level reported one foot above land surface, 7/46.
do	8	15	8/12/47	C,E	25	8/12/47	3.5	D	—	Water reported good. See sample log.
do	14	18	11/15/49	C,E	12	11/15/49	3.0	D	—	Water reported good.
do	10	20	4/11/52	C,H	25	4/11/52	2.5	D	—	Do
do	6	12	7/20/50	C,E	25	7/20/50	4.1	D	—	Do
do	10	18	12/10/52	C,E	25	12/10/52	3.1	D	—	Do
do	12	19	12/18/52	C,H	25	12/18/52	3.6	D	—	Water reported slightly hard.
do	8	15	8/4/52	C,E	25	8/4/52	3.6	D	59	Water reported good.
do	10	20	10/4/51	C,H	25	10/4/51	2.5	D	—	Do
do	8	18	5/4/48	C,E	8	5/4/48	.8	D	—	Do
do	2	15	3/15/52	C,H	25	3/15/52	1.9	D	58	Water reported good. Static level 0.50 ft. below land surface, 6/23/53. See driller's log.
do	10	21	11/12/52	C,H	25	11/12/52	2.2	D	—	Water reported good. Static level 5.77 ft below land surface, 6/23/53. See driller's log.
do	4	13	11/26/51	C,E	20	11/26/51	2.2	D	—	Water reported good.
do	4	12	5/22/51	N	22	5/22/51	2.7	N	—	See driller's log.
do	3	12	11/21/51	C,E	20	11/21/51	2.2	D	—	Water reported good.
do	12	16	10/1/46	C,H	25	10/1/46	6.2	D	—	Water reported good.
do	7	11	4/10/48	C,E	8	4/10/48	2.0	D	—	Do
do	4	12	9/23/52	C,H	25	9/23/52	3.1	D	—	See driller's log.
do	4	12	9/26/52	C,E	25	9/26/52	3.1	D	—	Water reported good.
do	4	15	2/23/53	C,E	25	2/23/53	2.3	D	—	Do
do	4	15	2/27/53	C,H	25	2/27/53	2.3	D	—	Do
do	4	12	10/8/52	C,E	25	10/8/52	3.1	D	—	Do
do	4.58 m	—	6/23/53	C,H	—	—	—	D	58.5	Do
do	6	9	10/10/45	(J,E)? C,H	25	10/10/45	8.3	D	—	Do
do	5	15	10/13/52	C,H	25	10/13/52	2.5	D	—	Water reported good. See driller's log.
do	6	10	5/15/47	J,E	8	5/15/47	2.0	C	—	Water reported good. Motel.
do	5	7	11/21/47	C,H	10	11/21/47	5.0	D	—	
do	3	9	9/30/50	J,E	25	9/30/50	4.1	D	—	Water reported good.
do	16	30	8/15/52	C,H	20	8/15/52	1.6	D	57.5	Water reported good. Static level 13.07 ft. below land surface, 6/24/53.
do	4	10	6/24/53	C,H	20	6/24/53	3.3	C	57.5	Water reported good. Static level 2.22 ft. below land surface, 6/24/53. See driller's log.

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ec 40	Fred Quimby	Wm. Aaron	1953	5	Drilled	285	1½	265	0
Ec 41	Harvey Ruth	do	1952	2	do	205	2½	180	0
Ec 42	Mrs. George Prouse	do	1951	16	do	315	1½	285	0
Ec 43	Anna Moore	A. W. Hudson	1949	3	do	220	1½	189	0
Ec 44	Jack Hunter	Wm. Aaron	1946	6	do	233	1½	200	0
Ec 45	Earl Meredith	A. W. Hudson	1951	3	do	235	1½	196	0
Ec 46	Raymond Warner	A. Bailey	1949	16	do	315	1½	280	0
Ec 47	Doris Banning	A. W. Hudson	1947	8	do	230	1½	192½	0
Ec 48	Bertha Emory	do	1951	20	do	265	1½	231	0
Ec 49	Walter Jewell	do	1948	18	do	235	1½	196	0
Ec 50	W. Washington	do	1952	27	do	280	1½	245	0
Ec 51	A. F. Ihle	Wm. Aaron	1946	6	do	220	1½	190	0
Ec 52	Wrightson Wilson	A. Bailey	1949	25	do	240	2½	80	0
Ec 53	Howard Coleman	do	1948	10	do	210	1½	190	0
Ec 54	Wrightson Wilson	Wrightson Wilson	1948	25	Driven	20	1¼	—	—
Ec 55	F. E. Saumenig	Wm. Aaron	1953	5	Drilled	210	2½	190	0
Ec 56	Parker Downes	A. W. Hudson	1950	8	do	245	1½	215	0
Ec 57	Thomas Carr	do	1951	19	do	294	1½	254	0
Ec 58	Lena Shanks	A. Bailey	1950	19	do	225	1½	200	0
Ec 59	Thomas Carr	—	—	19	Driven	13.7	1¼	—	—
Ec 60	Evermond Burns	Wm. Aaron	1952	16	Drilled	210	1½	190	0
Ec 61	Ray Ewing	do	1951	19	do	252	1½	235	0
Ec 62	E. R. Mills	A. W. Hudson	1948	17	do	240	1½	202	0
Ec 63	J. B. Baker, Jr.	do	1951	6	do	230	1½	194	0
Ec 64	Carrie Webb	do	1951	17	do	245	1½	220	0
Ec 65	Walter Jewell	A. Bailey	1950	18	do	242	1½	190	0
Ec 66	Roy Radcliff	Wm. Aaron	1951	15	do	230	1½	210	0
Ec 67	Joseph M. Cook	do	1946	20	do	220	1½	200	0
Ec 68	Roy Girod	A. W. Hudson	1952	18	do	235	1½	205	0
Ec 69	William Greaves	do	1950	18	do	255	1½	215	0
Ec 70	Joe Gernest	A. Bailey	1949	9	do	228	1½	212	0
Ec 71	Hersey Johnson	A. W. Hudson	1948	7	do	230	1½	192	0
Ec 72	Howard Wilson	do	1933	19	do	280	1½	257	0
Ec 73	C. J. Liberta	A. W. Hudson	1953	9	do	230	1½	189	0
Ec 74	H. M. Grief	Wm. Aaron	1953	9	do	180	1½	180	0
Ec 75	H. D. Tarbutton	A. W. Hudson	1953	9	do	230	1½	190	0
Ec 76	Fred Gray	Wm. Aaron	1953	9	do	200	1½	180	0
Ec 77	J. O. Dumber	A W. Hudson	1953	9	do	230	1½	189	0
Ec 78	Clifton Pierson	do	1949	9	do	248	1½	189	0
Ec 79	J. T. Melvin	do	1948	18	do	244	1½	210	0
Ec 80	Mrs. Addie Knight	do	1948	19	do	245	1½	215	0
Ec 81	Mrs. B. M. Simpson	do	1953	18	do	245	1½	210	0
Ec 82	Peggy Perry	do	1953	19	do	230	1½	189	0
Ec 83	Pearl O'Donnel	Wm. Aaron	1953	10	do	200	1½	181	0
Ed 1	Robert Marshbank	do	1952	12	do	285	1½	260	0
Ed 2	Jake Wilson	A. W. Hudson	1952	16	do	235	1½	205	0
Ed 3	Benjamin Lane	Wm. Aaron	1952	14	do	230	2½	210	0

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Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°Fe.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Aquia	12	24	3/20/53	C,H	20	3/20/53	1.6	D	—	Water reported good.
do	2	21	6/24/52	—	45	6/24/52	2.3	C	—	Oyster packing house. See driller's log.
do	14	20	3/15/51	C,H	20	3/15/51	3.3	C	—	Water reported good. General store. See driller's log.
do	2	10	7/2/49	C,H	20	7/2/49	2.5	D	—	Water reported good. See driller's log.
do	12	14	8/20/46	C,E	15	8/20/46	7.5	D	—	Water reported good.
do	3	14	2/28/51	C,E	30	2/28/51	2.7	D	—	Do
do	19	21	9/9/49	C,E	15	9/9/49	7.5	D	—	Do
do	8	16	4/12/47	C,H	25	4/12/47	3.1	D	—	Do
do	18	29	3/8/51	,E	30	3/8/51	2.7	D	—	Water reported good. See driller's log.
do	12	18	9/30/48	C,H	20	9/30/48	3.3	D	—	Water reported good.
do	25	32	10/4/52	C,E	20	10/4/52	2.8	D	—	Water reported good. See driller's log.
do	10	14	8/1/46	C,E	15	8/1/46	3.7	D	—	Water reported good.
do	26	30	8/5/49	J,E	10	8/5/49	2.5	D,F	—	Water reported slightly hard.
do	10	15	6/8/48	C,E	10	6/8/48	2.0	D	—	Water reported good. See driller's log.
Talbot	—	—	—	C,H	—	—	—	N	—	Water reported irony.
Aquia	5	22	3/27/53	J,E	40	3/27/53	2.3	C	—	Water reported good. Motel. Static level 2.70 ft. below land surface, 6/24/53. See driller's log.
do	8	18	9/13/50	C,E	20	9/13/50	2.0	D	—	Water reported good.
do	18	30	10/12/51	C,E	25	10/12/51	2.1	D	—	Water reported good. See driller's log.
do	7	10	8/20/50	C,H	16	8/20/50	5.4	D	—	Water reported good.
Talbot	1.85m	—	6/25/53	N	—	—	—	N	60	Water reported irony.
Aquia	8	16	8/5/52	C,—	25	8/5/52	3.1	D	58	Water reported good.
do	22	31	6/11/51	J,E	18	6/11/51	2.0	D,F	—	Water reported good. See driller's log.
do	8	18	5/17/48	C,E	8	5/17/48	.8	D	—	Water reported good.
do	4	10	5/15/51	J,E	30	5/15/51	5.0	D	—	Do
do	10	20	8/2/53	J,E	25	8/2/53	2.5	D	—	Do
do	12	16	8/25/50	C,H	15	8/25/50	3.7	D	—	Do
do	7	24	10/30/51	C,E	20	10/30/51	1.2	D	—	Do
do	14	16	8/10/46	C,H	15	8/10/46	7.5	D	58	Do
do	18	28	7/8/52	C,H	25	7/8/52	2.5	D	—	Water reported good. See driller's log.
do	14	20	2/18/50	C,E	20	2/18/50	3.3	D	—	Do
do	18	20	9/3/49	C,E	15	9/3/49	7.5	D	—	Water reported good.
do	12	18	1948	C,H	25	1948	4.1	D	—	Do
do	—	—	—	C,E	—	—	—	D,F	—	Water reported good. Well was flowing on 8/26/53.
do	7	15	6/4/53	C,E	25	6/4/53	3.1	D	—	Water reported good.
do	6	14	6/16/53	C,H	20	6/16/53	2.5	D	—	Do
do	7	15	7/3/53	C,E	25	7/3/53	3.1	D	—	Do
do	6	14	6/18/53	J,E	25	6/18/53	3.1	D	—	Do
do	4	13	6/1/53	C,H	25	6/1/53	2.8	D	—	Water reported good. See driller' log.
do	8	20	10/3/49	C,E	20	10/3/49	1.7	D	—	Water reported good.
do	12	14	2/12/48	C,H	20	2/12/48	10.0	D	—	Do
do	15	20	7/19/48	C,E	30	7/19/48	6.0	D	—	Water reported good. See driller's log.
do	17	26	7/7/53	C,H	25	7/7/53	2.8	D	—	Do
do	4	13	4/8/53	J,E	25	4/8/53	2.8	C	—	Water reported good. Motel.
do	4	—	9/17/53	S,H	26	9/17/53	—	D	59	See sample log and chemical analysis.
do	16	30	8/12/52	C,E	20	8/12/52	1.4	D	—	Water reported good. See driller's log.
do	18	28	7/14/52	S,H	25	7/14/52	2.5	D	—	Do
do	18	26	9/19/52	J,E	20	9/19/52	2.5	C	—	Water reported good. Gas station. See driller's log.

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ed 4	John Whaley	L. Rude & Son	1948	63	do	394	5	373	18
Ed 5	Willard Dodd	M. A. Pentz	1952	59	do	285	4	185	0
Ed 6	Curtis Wilson	A. W. Hudson	1952	16	do	260	1½	205	0
Ed 7	Henry Smith	Wm. Aaron	1950	18	do	241	1½	210	0
Ed 8	J. Warner	A. W. Hudson	1952	35	do	280	1½	240	0
Ed 9	Shore Amoco Service Station	C. H. Rude	1952	14	do	252	2½	208	0
Ed 10	Queenstown Amoco Service	do	1953	14	do	252	2½	210	0
Ed 11	George Steinfelt	A. Bailey	1947	14	do	205	1½	190	0
Ed 12	Earle Jester	A. W. Hudson	1949	14	do	245	1½	210	0
Ed 13	Ellsworth Ford	M. A. Pentz	1949	8	do	200	4	180	0
Ed 14	J. T. Bishop	A. Bailey	1950	16	do	225	1½	200	0
Ed 15	Frederick Roser	A. W. Hudson	1951	58	do	285	1½	250	0
Ed 16	Holliday Heirs	McFarland	1903	58	Dug	35	60	—	—
Ed 17	Bishop McClyments	A. Bailey	1945	52	Drilled	264	3	—	—
Ed 18	Gordon L. Shawn	—	1918	65	Dug	40	60	—	—
Ed 19	Walter L. Whitby	—	1900	62	do	22	42	—	—
Ed 20	Oliver P. Alford	—	—	20	Drilled	265	3½	—	—
Ed 21	Mrs. Caroline Foulke	M. Harrison	1935	18	do	500	4	—	—
Ed 22	S. Grason Chance	—	—	68	Driven	37	1½	—	—
Ed 23	Walter Wifley	—	—	68	Dug	22	54	—	—
Ed 24	Herbert Carter	—	—	59	Driven	22	1½	—	—
Ed 25	Joseph Rhyanes	—	1900	50	Dug	20	48	—	—
Ed 26	Thomas Callahan	—	1901	60	do	28	60	—	—
Ed 27	Charles Griffin	—	1928	66	Driven	22	1½	—	—
Ed 28	Richard Davidson	—	1880	40	Dug	16	48	—	—
Ed 29	Jas. S. Wheatley	—	1895	40	do	10	48	—	—
Ed 30	Dr. W. H. Fisher	—	1900	40	do	22	54	—	—
Ed 31	Herbert Carter	—	1900	20	do	15	48	—	—
Ed 32	Houghton Estates	—	1900	51	do	22	54	—	—
Ed 33	Goldstein Enterprises	—	1953	62	Drilled	295	1½	255	0
Ed 34	S. E. W. Friel	—	1925	35	do	260	4½	—	0
Ed 35	Do	—	1945	35	do	260	6	250	0
Ed 36	Town of Queenstown	Shannahan Artesian Well Co.	1931	15	do	320	6	186	0
Ed 37	Weston	—	—	18	do	242	1¼	—	—
Ed 38	Schelberg	—	—	20	do	218	1¼	—	—
Ee 1	Roe Wood	A. Bailey	1949	76	do	140	4	120	—
Ee 2	Edward Moore	do	1949	80	do	175	3½	—	—
Ee 3	Harry H. Simpson	—	1900	62	Dug	18	42	—	—
Ee 4	Mrs. Annie Merrick	—	1900	45	do	25	42	—	—
Ee 5	Paul R. Lawrence	A. Thomas	1948	45	Driven	30	1½	—	—
Ee 6	Percy Allen	W. Blakesly	1952	45	Drilled	200	1½	50	0
Ee 7	Oscar Drummer	A. Bailey	1948	60	do	270	2½	250	0

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Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Aquia	55	—	5/–/48	J,E			—	D	—	Water reported slightly hard. See driller's and sample logs.
do	28	40	10/31/52	J,E	80	10/31/52	6.6	D,F	—	Do
do	18	28	7/30/52	C,H	25	7/30/52	2.5	D	58	Water reported good.
do	20	26	11/2/52	C,E	20	11/2/52	3.3	D	—	Water reported good. See driller's log.
do	18	28	8/23/52	J,E	25	8/23/52	2.5	D	—	Do
do	35	—	9/–/52	J,E	—	—	—	C	—	Water reported good. Gas station.
do	21	—	3/9/53	J,E	—	—	—	C	—	Do
do	8	10	11/10/47	C,E	10	11/10/47	5.0	D	—	Water reported good.
do	16	22	5/20/49	J,E	20	5/20/49	3.3	D	—	Do
do	14	26	8/10/49	J,E	20	8/10/49	1.7	D,F	—	Do
do	12	14	8/12/50	J,E	20	8/12/50	10.0	C	—	Ice plant; water used for cooling condensers.
do	15	25	8/15/51	J,E	20	8/15/51	2.0	D,F	—	Water reported good. See driller's log.
Wicomico	27	—	7/9/53	C,E	—	—	—	D,F	—	Water reported good.
Aquia	—	—	—	J,E	—	—	—	D,F	—	Do
Wicomico	34	—	7/13/53	J,E	—	—	—	D,F	—	Do
do	17	—	7/13/53	C,E	—	—	—	D	—	Do
Aquia	—	—		C,E	—	—	—	D,F	—	Do
Monmouth(?)	—	—	—	C,E	—		—	D,F	—	Water reported good. Depth doubtful.
Wicomico	15	—	7/13/53	C,E	—	—		D,F	—	Water reported good.
do	15.35^{m}	—	9/1/53	C,E	—	—	—	D,F	—	Do
do	14	—	9/1/53	C,H	—	—	—	D	—	Do
do	11.5	—	9/1/53	C,E	—	—	—	D,F	—	Do
do	19	—	9/1/53	T,E	—	—	—	D	—	Water reported fairly soft, irony.
do	—	—	—	S,H	—		—	D	—	Water reported good.
do	4-6	—	9/1/53	C,H	—	—	—	D,F	—	Do
do	4.15^{m}	—	9/1/53	S,E	—	—	—	D,F	—	Do
do	11.80^{m}	—	9/1/53	J,E	—	—	—	D,F	—	Do
Talbot	9.10^{m}	—	9/1/53	C,E	—	—	—	D,F	—	Do
Wicomico	17	—	9/1/53	C,E	—	—	—	D,F	—	Do
Aquia	40	50	4/24/53	J,E	20	4/24/53	2.0	D	—	Water reported good. See driller's log.
do	18	—	8/26/53	T,E	100	8/26/53	—	C	—	Water reported good. Cannery.
do	18	88	8/26/53	T,E	200	8/26/53	2.9	C	—	Do
do	9.5	—	1931	T,E	212	2/–/55	—	P	54	Pumped 300 gpm against no head. See driller's log and chemical analysis.
do	19.74^{m}	—	2/–/55	C,H	—	—	—	N	—	
do	23.13^{m}	—	2/26/55	C,H	—	—	—	D	—	
Eocene series	18	20	8/29/49	C,E	10	8/29/49	5.0	D,F	—	Water reported somewhat hard and irony. See driller's log.
do	18	20	8/25/49	C,E	10	8/25/49	5.0	D,F	60	Water reported hard, cloudy. Static level 14.90 ft. below land surface, 7/1/53. Well measured 64.4 ft. deep.
Wicomico	13	—	7/9/53	C,E	—	—	—	D	—	Went dry in 1932.
do	3-5	—	—	C,E	—	—	—	D	—	Water reported good.
do	16	—	7/9/53	C,E	—	—	—	D	—	Probably somewhat irony. Flows at times.
—	—	—	—	C,E	—	—	—	D	—	Water reported good. Well flows continuously.
Eocene series	60	—	12/–/46	J,E	—	—	—	D,F	—	Water reported hard, irony.

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Ee 8	Ralph C. Baynard	Wm. Aaron	1946	78	Drilled	410	2½	360	0
Ee 9	Valliant & Crown	M. A. Pentz	1944	70	do	85	4	85	0
Ee 10	Dawson Foster	—	—	77	do	490	8	—	—
Ee 11	J. Grant Yates, Sr.	—	1900	70	Dug	32	54	—	—
Ee 12	S. E. W. Friel	—	1947	40	Drilled	205	6	200	0
Ee 13	J. Lawrence Wood	—	1900	76	Dug	23	54	—	—
Ee 14	C. Frank Boyles	—	—	50	do	19	48	—	—
Ee 15	F. Asbury Bartlett	—	1900	63	do	20	48	—	—
Ee 16	Phillips Canning Co.	Shannahan Artesian Well Co.	1940	71	Drilled	647	10	519	—
Ee 17	Wm. G. Boyles	—	1917	70	Dug	19	48	—	—
Ee 18	S. E. W. Friel	—	1935	40	Drilled	205	6	200	0
Ee 19	Do	—	1935	40	do	205	4½	205	0
Ef 1	Robert Dean	Shannahan Artesian Well Co.	1946	54	do	143	4½	143	0
Ef 2	Horace Morgan	M. A. Pentz	1947	30	do	160	3	84	—
Ef 3	Howard Eley	—	—	50	do	118	3½	94	0
Ef 4	Austin Eaton	—	1900	60	Dug	22	60	—	—
Ef 5	Joe Jackson	—	—	60	do	24	48	—	—
Ef 6	Do	M. A. Pentz	1948	80	Drilled	323	4	—	—
Ef 7	Charles E. Barton	—	—	50	Dug	22	48	—	—
Ef 8	Louis A. Rietzou	—	1948	44	Driven	16	1¼	—	
Ef 9	W. B. Messix	—	—	62	Drilled	450	3½	450	—
Ef 10	H. T. Messix	—	1939	55	do	120	4	120	—
Ef 11	Emmitt Sylvester	—	1900	42	Dug	30	48	—	—
Ef 12	Mrs. Fred Sylvester	—	1900	51	do	30	48	—	—
Ef 13	Earle R. Rittenhouse	—	1944	68	do	18	48	—	—
Ef 14	James W. Maitland	—	1900	62	do	18	48	—	—
Ef 15	Charles Jarrell & Co.	—	1950	80	Drilled	110	2½	110	—
Ef 16	Joseph M. Heins	—	1937	80	Dug	42	60	—	
Ef 17	James E. Foster	—	1900	50	Driven	35	1¼	—	—
Ef 18	Chas. E. Cannon	M. A. Plentz	1951	45	Drilled	192	4	192	—
Ef 19	Christopher Nichols	—	1900	60	Dug	37	48	—	—
Ef 20	J. E. Dolby	—	1900	75	do	24	60	—	—
Ef 21	Mrs. Howard Turner	—	1900	64	do	22	48	—	—
Ef 22	E. L. Winer	—	—	80	do	22	54	—	—
Ef 23	Lewis Sneed	—	1900	60	do	24	48	—	—
Ef 24	Dan Shortall	—	1900	68	do	25	72	—	—
Fa 1	Queen Annes Holding Corporation	A. W. Hudson	1950	8	do	285	1½	243	—
Fa 2	D. Nichols	—	—	10	Dug	15	—	—	—
Fa 3	A. W. Keene	—	—	11	do	15	—	—	—
Fa 4	S. Hollis	—	—	5	do	12	36	—	—
Fa 5	H. W. DeBaugh	Wm. Aaron	1950	8	Drilled	270	1½	—	—
Fa 6	Samuel Rosenberg	A. W. Hudson	1951	8	do	230	1½	190	0
Fa 7	C. Hadler	do	1953	8	do	235	1½	196	0
Fa 8	Sam Marcus	do	1951	8	do	230	1½	193	0
Fa 9	Mrs. Isadore Gudelsky	do	1951	8	do	230	1½	196	0
Fa 10	Charles Jeffries	do	1952	8	do	225	1½	192	0
Fa 11	Sam Badian	do	1951	8	do	235	1½	196	0

—Continued

Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Aquia	64	—	3/-/44	C,E	—	—	—	D,F	—	Water reported fairly hard.
Calvert	10	—	—	C,E	20	—	—	D,F	—	Water reported good.
Monmouth	—	—	—	—	—	—	—	N	—	Old cannery well.
Wicomico	18	—	7/14/53	C,E	—	—	—	D	—	Water reported good.
Aquia	18	—	8/26/53	T,E	200	—	—	C	—	Do
Wicomico	16	—	7/14/53	C,E	—	—	—	D,F	—	Do
do	8.50m	—	7/14/53	J,E	—	—	—	D,F	—	Do
do	11.50m	—	7/14/53	C,H	—	—	—	D,F	—	Do
Aquia(?)	60	220	7/14/53	T,E	—	—	—	C	—	Cannery.
Wicomico	12	—	7/14/53	C,E	—	—	—	D	—	Water reported good.
Aquia	18	—	8/26/53	T,E	200	—	—	C	—	Water reported good. Cannery.
do	18	90	8/26/53	T,E	100	—	1.3	C	—	Do
Calvert	23	—	7/17/53	C,E	—	—	—	D,F	—	Water reported fairly hard.
do	26	35	11/1/47	C,E	40	11/1/47	4.4	D	—	Water reported very hard. See driller's log.
do	27	—	7/17/53	J,E	—	—	—	D,F	—	Water reported fairly hard.
Wicomico	—	—	—	C,E	—	—	—	D,F	—	Water reported good.
do	3-4	—	1952	J,E	—	—	—	D	—	Do
Eocene series	—	—	—	J,E	—	—	—	D	—	Do
Wicomico	13-16	—	7/10/53	C,E	—	—	—	D	—	Do
do	—	—	—	C,E	—	—	—	C	—	Water reported good. Chicken plant.
Aquia	11	—	7/14/53	J,E	—	—	—	D,F	—	Water reported hard.
Calvert	20	—	7/14/53	C,E	—	—	—	D,F	—	Water reported hard, slightly irony.
Wicomico	22	—	7/14/53	C,E	—	—	—	D,F	—	Water reported good.
do	22	—	7/14/53	C,E	—	—	—	D,F	—	Do
do	12	—	7/14/53	J,E	—	—	—	D,F	—	Do
do	10.20m	—	7/15/53	J,E	—	—	—	D,F	—	Do
Calvert	—	—	—	J,E	—	—	—	F	—	Do
Wicomico	20	—	7/15/53	C,E	—	—	—	D,F	—	Do
do	15	—	7/15/53	C,H	—	—	—	D	—	Do
Calvert	—	—	—	J,E	—	—	—	D,F	—	Do
Wicomico	12	—	7/15/53	S,E	—	—	—	D,F	—	Do
do	17	—	7/16/53	C,H	—	—	—	D	—	Do
do	15	—	7/16/53	C,H	—	—	—	D	—	Do
do	12	—	7/16/53	C,H	—	—	—	D	—	Do
do	13	—	7/16/53	C,E	—	—	—	D,F	—	Do
do	16	—	7/17/53	J,E	—	—	—	F	—	Do
Aquia	8	15	9/18/50	C,H	25	9/18/50	3.5	D	—	See driller's log.
Talbot	8.86m	—	7/6/50	C,H	—	—	—	D	65	Water reported unfit for use.
do	—	—	—	C,H	—	—	—	D	62	Water reported good.
do	2.76m	—	7/6/50	B,H	—	—	—	N	62	
Aquia	9	14	7/24/50	S,E	30	7/24/50	6.0	D	—	Water reported good.
do	3	13	4/2/51	J,E	30	4/2/51	3.0	D	—	Water reported good. See driller's log.
do	15	25	6/11/53	J,E	25	6/11/53	2.5	D	—	Water reported good.
do	10	20	6/25/51	J,E	20	6/25/51	2.0	D	—	Do
do	10	25	12/8/51	J,E	25	12/8/51	1.6	D	—	Do
do	10	21	3/31/52	J,E	25	3/31/52	2.3	D	—	Do
do	6	12	7/30/51	J,E	20	7/30/51	3.3	D	—	Do

TABLE 47

Well number (QA-)	Owner or name	Driller	Date completed	(Altitude feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Fa 12	J. Glynn	A. W. Hudson	1951	8	Drilled	234	1½	190	0
Fa 13	Nathan Morris	do	1952	8	do	230	1½	198	0
Fa 14	Mr. Rockwell	do	1951	8	do	230	1½	196	0
Fa 15	Herman Milestone	do	1950	8	do	235	1½	190	0
Fa 16	Simon Sherman	do	1950	8	do	235	1½	190	0
Fa 17	Chas. S. Dewey	Wm. Aaron	1946	10	do	200	1½	190	0
Fa 18	A. W. Keene	do	1950	13	do	293	2½	270	0
Fa 19	H. H. Cecil	do	1950	6	do	275	1½	251	0
Fa 20	James Kennedy	A. W. Hudson	1951	6	do	280	1½	240	0
Fa 21	James W. Baker	Wm. Aaron	1950	6	do	225	1½	200	0
Fa 22	Paul Schmidt	do	1950	6	do	250	1½	230	0
Fa 23	Nicholas Mueller	do	1950	6	do	280	1½	265	0
Fa 24	C. E. Wallman	do	1950	6	do	285	1½	243	0
Fa 25	Warren Shuping	Wm. Aaron	1950	6	do	285	1½	243	0
Fa 26	M. H. Sherwood	do	1950	6	do	220	1½	200	0
Fa 27	Melvin Forsythe	do	1953	6	do	185	1½	185	0
Fa 28	Earl Quandt	do	1951	6	do	280	1½	240	0
Fa 29	Paul Palmer	do	1951	6	do	275	1½	252	0
Fa 30	Robert C. Henley	do	1951	6	do	275	1½	248	0
Fa 31	J. L. Johnson	do	1951	6	do	223	1½	200	0
Fa 32	David M. Nichols & Co.	A. W. Hudson	1951	12	do	285	1½	240	0
Fa 33	Page Reader	do	1952	6	do	275	1½	220	0
Fa 34	Wm. Anderson	Wm. Aaron	1952	6	do	215	1½	200	0
Fa 35	Paul Deardorf	A. W. Hudson	1952	6	do	280	1½	247	0
Fa 36	Wm. E. Tuchton	do	1952	6	do	290	1½	254	0
Fa 37	R. Wood	Wm. Aaron	1950	6	do	285	1½	243	0
Fa 38	P. G. Sedley	A. W. Hudson	1951	6	do	265	1½	227	0
Fa 39	David M. Nichols & Co.	Wm. Aaron	1953	4	do	215	1½	210	0
Fa 40	Do	do	1953	4	do	215	1½	210	0
Fa 41	Do	do	1953	4	do	215	1½	—	0
Fa 42	Carville Benton	A. W. Hudson	1952	4	do	287	1½	247	0
Fa 43	Sam Aaron	do	1951	12	do	294	1½	264	0
Fa 44	Edward Heartwell	do	1952	10	do	235	1½	192	0
Fa 45	Sam Aaron	Wm. Aaron	1950	11	do	276	1½	260	0
Fa 46	John Roane	do	1951	10	do	240	1½	220	0
Fa 47	Nathan Morris	A. W. Hudson	1953	8	do	293	1½	—	0
Fa 48	Roy Hubscher	Wm. Aaron	1953	12	do	261	1½	243	0
Fc 1	Sam Perrera	A. W. Hudson	1951	10	do	415	1½	380	0
Fc 2	Joseph A. Miller	A. Bailey	1948	11	do	370	1½	350	0
Fc 3	J. W. Wolf	do	1949	11	do	380	2½	360	0
Fc 4	Mrs. Charles C. Higdon	A. W. Hudson	1953	11	do	400	1½	365	0
Fc 5	Linder Gabler	do	1952	12	do	397	1½	357	0
Fc 6	J. A. Barkley	A. Bailey	1949	17	do	380	2½	360	0
Fd 1	Jacqueline Stewart	—	1900	15	Dug	18	54	—	—
TAL-									
Af 5	M. Chores	—	—	25	Drilled	185	—	—	—
Af 6	Elizabeth Dulin	M. A. Pentz	1947	25	do	165	3	106	—

—Continued

Water-bearing formation	Water level (feet below land surface) Static	Pumping	Date	Pumping equipment	Yield Gallons a minute	Date	Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Aquia	12	19	4/19/51	J,E	30	4/19/51	4.3	D	—	Water reported good.
do	12	20	5/7/52	J,E	25	5/7/52	3.1	D	—	Do
do	3	15	10/17/51	J,E	25	10/17/51	2.1	D	—	Do
do	10	20	12/15/50	J,E	20	12/15/50	2.0	D	—	Do
do	10	20	12/15/50	J,E	20	12/15/50	2.0	D	—	Water reported good. See driller's log.
do	10	14	4/-/46	C,E	15	4/-/46	3.7	D	—	Water reported irony. See driller's log.
do	6	22	9/15/50	C,E	50	9/15/50	3.1	D,F	—	Water reported good. See driller's log.
do	5	10	8/25/50	J,E	25	8/25/50	5.0	D	—	Water reported good.
do	7	18	8/7/51	J,E	25	8/7/51	2.2	D	—	Water reported good. See driller's log.
do	8	14	8/6/50	J,E	20	8/6/50	3.3	D	—	Water reported good.
do	5	12	11/18/50	—	30	11/18/50	4.2	D	—	Do
do	8	14	8/30/50	—	20	8/30/50	3.3	D	—	Do
do	8	15	9/18/50	J,E	25	9/18/50	3.5	D	—	Do
do	8	15	9/18/50	J,E	25	9/18/50	3.5	D	—	Do
do	8	14	10/10/50	J,E	25	10/10/50	4.1	D	—	Do
do	6	12	5/30/53	J,E	20	5/30/53	3.3	D	—	Do
do	8	18	3/27/51	J,E	20	3/27/51	2.0	D	—	Do
do	5	12	4/14/51	—	25	4/14/51	3.5	D	—	Do
do	10	25	5/7/51	J,E	25	5/7/51	1.6	D	—	Do
do	5	14	8/11/51	—	25	8/11/51	2.8	D	—	Do
do	12	20	2/22/51	J,E	30	2/22/51	3.7	D	—	Water reported good. See driller's log.
do	4	10	6/3/52	C,E	25	6/3/52	4.1	D	—	Do
do	8	14	5/15/52	—	20	5/15/52	3.3	D	—	Water reported good.
do	6	17	4/30/52	C,E	25	4/30/52	2.2	D	—	Do
do	6	17	3/20/52	C,E	20	3/20/52	1.8	D	—	Do
do	8	15	9/18/50	J,E	25	9/18/50	3.5	D	—	Water reported good. See driller's log.
do	12	20	8/23/51	C,E	25	8/23/51	3.1	D,F	—	Do
do	7	11	2/6/53	C,E	12	2/6/53	3.0	D	—	See driller's log and chemical analysis.
do	6	12	2/2/53	C,E	15	2/2/53	2.5	D	—	Water reported good.
do	6	12	1/24/53	C,E	15	1/24/53	2.5	D	—	Do
do	4	12	8/21/53	C,H	25	8/21/53	3.1	D	—	Water reported good. Static level 3.68 ft. below land surface, 8/21/53. See driller's log.
do	15	25	11/13/51	C,H	20	11/13/51	2.0	D	—	Water reported good. See driller's log.
do	5	15	10/8/52	S,E	25	10/8/52	2.5	D	—	Do
do	12	18	8/25/50	C,H	20	8/25/50	3.3	D,F	—	Water reported good.
do	6	16	11/15/51	C,E	20	11/15/51	2.0	D	—	Water reported good. See driller's log.
do	—	—	—	—	—	—	—	—	—	Do
do	11.4	—	9/23/53	—	20	9/23/53	—	D	61.5	See sample log.
do	12	20	7/2/51	J,E	25	7/2/51	3.1	D	—	See driller's log.
do	10	15	7/20/48	—	15	7/20/48	3.0	D	—	Field test: Fe 0.2 ppm, H 120 ppm, pH 8.3. See driller's log.
do	16	20	9/23/49	—	15	9/23/49	3.7	D	—	Water reported good. See driller's log.
do	15	23	3/18/53	C,E	25	3/18/53	3.1	D	—	Water reported good.
do	10	18	8/18/52	C,E	25	8/18/52	3.1	D	—	Do
do	16	20	9/15/49	—	15	9/15/49	3.8	D	—	Water reported good. See driller's log.
Talbot	13	—	9/1/53	C,H	—	—	—	D,F	—	Water reported good.
Calvert(?)	—	—	—	—	—	—	—	—	—	See chemical analysis.
Calvert	25	34	11/3/47	J,E	30	11/3/47	3.3	D	—	Water reported very hard. See driller's log.

TABLE 47

Well number (TAL)	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Length of casing (feet)	Length of screen (feet)
Af 7	Frank Messick	M. A. Pentz	1948	23	Drilled	170	3	105	—
Af 8	Mrs. M. J. Spyke	L. Rude & Son	1952	25	do	165	2½	136	0
Af 9	Tri-County Cooperative	—	—	12	do	250	8	100	—
Cb 89	Pan-American Refining Corp.	Layne-Atlantic	1953	13	do	1,520	10–4	—	—

—Concluded

Water-bearing formation	Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
	Static	Pumping	Date		Gallons a minute	Date				
Calvert	24	40	11/13/48	C,E	15	11/13/48	0.9	D	—	Water reported very hard. See driller's log.
do	30	—	4/-/52	J,E	35	4/-/52	—	D	—	Do
—	—	—	—	T,E	—	—	—	C	—	Water reported good. Cannery. Well flows when plant is not operating.
Magothy(?) and Raritan(?)	—	—	—	—	—	—	—	N	69	Flow 12 gpm at 915–980 ft. and 8.5 gpm at 1,351–1,420 ft. Well capped but not plugged.

TABLE 48

Drillers' Logs of Wells in Cecil county

	Thickness (feet)	Depth (feet)
Ce-Aa 1 (Altitude: 380 feet)		
Crystalline rocks:		
Dirt	10	10
Rock (gabbro), soft	40	50
Ce-Aa 2 (Altitude: 380 feet)		
Crystalline rocks:		
Rock (serpentine)	60	60
Ce-Aa 3 (Altitude: 390 feet)		
Crystalline rocks:		
Dirt	6	6
Rock (serpentine)	73	79
Ce-Aa 4 (Altitude: 340 feet)		
Crystalline rocks:		
Clay, yellow	60	60
Rock (serpentine), soft, greenish-black	20	80
Rock (serpentine), hard, black	5	85
Ce-Aa 5 (Altitude: 460 feet)		
Crystalline rocks:		
Dirt and rock (serpentine) (water)	41	41
Ce-Aa 8 (Altitude: 280 feet)		
Crystalline rocks:		
Dirt and stones	13	13
Hardpan	30	43
Rock (gabbro) (water)	7	50
Ce-Aa 9 (Altitude: 325 feet)		
Crystalline rocks:		
Dirt and stone	20	20
Rock (gabbro) (water)	19	39
Ce-Aa 17 (Altitude: 325 feet)		
Crystalline rocks:		
Dirt	4	4
Stones and dirt	18	22
Rock (serpentine) (water)	28	50
Ce-Ab 1 (Altitude: 350 feet)		
Crystalline rocks:		
Clay and boulders	11	11
Granite (granodiorite), gray	72	83

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Ab 17 (Altitude: 340 feet)		
Crystalline rocks:		
Dirt and soft rock	14	14
Rock (granodiorite), hard (water)	16	30
Ce-Ab 19 (Altitude: 380 feet)		
Crystalline rocks:		
Dirt	15	15
Rock (granodiorite)	20	35
Ce-Ab 20 (Altitude: 300 feet)		
Crystalline rocks:		
Clay, brown	10	10
Rock (gabbro), seamy, brown	5	15
Rock (gabbro), soft, brown	19	34
Rock (gabbro), loose, soft, brown (water)	3	37
Rock (gabbro), moderately hard, brown	10	47
Ce-Ab 26 (Altitude: 450 feet)		
Crystalline rocks:		
Dirt and stones	15	15
Rock (serpentine) (water)	65	80
Ce-Ab 28 (Altitude: 370 feet)		
Crystalline rocks:		
Clay, brown	6	6
Rock (granodiorite), rotten, gray	6	12
Silt, brown (water)	12	24
Clay, gray	14	38
Rock (granodiorite), soft, gray	7	45
Rock (granodiorite), hard, gray (water)	15	60
Ce-Ab 32 (Altitude: 280 feet)		
Crystalline rocks:		
Clay, brown	30	30
Rock (gabbro?), soft, brown (water at 36 feet)	18	48
Ce-Ab 33 (Altitude: 450 feet)		
Crystalline rocks:		
Dirt and stones	12	12
Rock (gabbro) (water)	28	40
Ce-Ab 36 (Altitude: 330 feet)		
Crystalline rocks:		
Clay, red	10	10
Rock, shale	20	30
Granite (granodiorite), gray	14	44

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Ab 40 (Altitude: 270 feet)		
Crystalline rocks:		
Clay, brown, and boulders	31	31
Rock (gabbro), solid	13	44
Ce-Ab 42 (Altitude: 410 feet)		
Crystalline rocks:		
Clay	11	11
Rock (granodiorite) (water)	48	59
Ce-Ab 43 (Altitude: 40 feet)		
Crystalline rocks:		
Clay, yellow	10	10
Rock (granodiorite), hard, gray	24	34
Water-bearing seams	1	35
Rock (granodiorite), hard, gray	15	50
Ce-Ac 1 (Altitude: 480 feet)		
Crystalline rocks:		
Clay, orange, "niggerhead" boulders	51	51
Rock (gabbro), soft, "rotten" (water)	5	56
Ce-Ac 6 (Altitude: 440 feet)		
Crystalline rocks:		
Rock (serpentine) (water at 46 feet)	68	68
Ce-Ac 7 (Altitude: 360 feet)		
Crystalline rocks:		
Clay	15	15
"Quicksand"	45	60
Clay, brown	15	75
Quartz (pegmatite?)	5	80
Ce-Ac 9 (Altitude: 420 feet)		
Crystalline rocks:		
"Sand and gravel"	30	30
Granite (granodiorite)	25	55
Ce-Ac 16 (Altitude: 400 feet)		
Crystalline rocks:		
Clay, brown	60	60
"Sandstone" (schist)	15	75
Ce-Ac 17 (Altitude: 420 feet)		
Crystalline rocks:		
Clay, brown	60	60
"Sandstone" (granodiorite)	15	75

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Ac 19 (Altitude: 430 feet)		
Crystalline rocks:		
Dirt	10	10
Clay	10	20
"Quicksand"	50	70
Rock (granodiorite)	20	90
Ce-Ac 20 (Altitude: 390 feet)		
Crystalline rocks:		
Clay and sand	85	85
Sandrock (schist)	3	88
Ce-Ac 21 (Altitude: 430 feet)		
Crystalline rocks:		
Clay, red	90	90
"Quicksand"	10	100
Clay, brown	14	114
"Gravel bed", white (schist)	1	115
Ce-Ac 23 (Altitude: 410 feet)		
Crystalline rocks:		
Clay, brown	15	15
Loam, sandy	15	30
"Sand" and clay	20	50
Clay, brown	5	55
Clay, green	10	65
Rock (schist), gray	3	68
Ce-Ac 25 (Altitude: 360 feet)		
Crystalline rocks:		
Dirt and gravel	28	28
Sand	4	32
Rock (granodiorite)	25	57
Rock (granodiorite), hard	15	72
Ce-Ac 26 (Altitude: 330 feet)		
Fill	2	2
Crystalline rocks:		
Clay, white and yellow; hard gravel	16	18
Rock, soft, gray	2	20
Clay, tough, yellow	17	37
Rock	2	39
Clay, yellow and gray	6	45
Rock, soft, gray and yellow	42	87
Rock, gray, white streaks (granodiorite?)	11	98

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Ac 27 (Altitude: 415 feet)		
Crystalline rocks:		
Clay, brown	15	15
(Description missing) (water)	5	20
Clay, gray	55	75
Rock (granodiorite), soft, gray	10	85
Ce-Ac 46 (Altitude: 405 feet)		
Crystalline rocks:		
Clay, brown	23	23
Rock, soft, gray (water)	17	40
Rock (gabbro-granodiorite), stiff, gray	10	50
Ce-Ac 47 (Altitude: 380 feet)		
Crystalline rocks:		
Clay, sandy, brown	30	30
Clay, sandy, yellow	45	75
Clay, sandy, dark blue (weathered gabbro)	15	90
Ce-Ac 51 (Altitude: 365 feet)		
Crystalline rocks:		
Clay, sandy	40	40
Clay, yellow	10	50
Granite (granodiorite), very hard	18	68
Ce-Ac 54 (Altitude: 460 feet)		
Crystalline rocks:		
Clay, brown	24	24
"Gravel bed" (water)	.5	24.5
Clay, brown	45.5	70
Silt, running, brown	71	141
Clay, dark brown	4	145
Rock (schist), rotten, gray (water)	5	150
Ce-Ac 58 (Altitude: 435 feet)		
Crystalline rocks:		
Clay, sandy	30	30
Clay, yellow	20	50
Clay, dark brown	30	80
Rock (schist), blue, not hard	8	88
Ce-Ad 1 (Altitude: 390 feet)		
Crystalline rocks:		
Top soil	1	1
Clay, sandy, red	37	38
Shale, soft, gray	17	55
Rock, black (schist-gabbro contact), not very hard (water)	3	58

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Ad 2 (Altitude: 460 feet)		
Crystalline rocks:		
"Quicksand" (weathered schist?)	80	80
(Description missing)	10	90
Ce-Ad 3 (Altitude: 410 feet)		
Crystalline rocks:		
"Quicksand"	80	80
Rock (schist)	10	90
Ce-Ad 5 (Altitude: 450 feet)		
Crystalline rocks:		
Clay	10	10
Quicksand	50	60
Rock (schist)	10	70
Ce-Ad 6 (Altitude: 425 feet)		
Crystalline rocks:		
Clay, red	4	4
Sand	74	78
Rock (schist), gray (water)	3	81
Ce-Ad 9 (Altitude: 380 feet)		
Crystalline rocks:		
Clay, red	63	63
Rock (granodiorite-schist contact), gray	47	110
Ce-Ad 36 (Altitude: 390 feet)		
Crystalline rocks:		
Clay, brown	13	13
Clay, wet, brown	25	38
Silt, running, brown	13	51
Rock (schist-gabbro contact), rotten, brown (water)	19	70
Ce-Ad 38 (Altitude: 430 feet)		
Crystalline rocks:		
Clay, yellow	8	8
Sand and clay	12	20
Sand	53	73
Shale (schist)	17	90
Shale (schist), hard	14	104
Ce-Ae 4 (Altitude: 245 feet)		
Crystalline rocks:		
Topsoil and shale	20	20
Rock (granodiorite), hard flint	84	104

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Ac 5 (Altitude: 360 feet)		
Crystalline rocks:		
Clay sandy	34	34
Rock (granodiorite), brown, with many crevices (water 49 ft.–59 ft.)	25	59
Ce-Ac 7 (Altitude: 360 feet)		
Crystalline rocks:		
Clay, red	5	5
Shale, gray	40	45
Rock (granodiorite), hard, gray	35	80
Granite (granodiorite)	25	105
Ce-Ac 8 (Altitude: 390 feet)		
Crystalline rocks:		
Topsoil	1	1
Clay	24	25
Sand	8	33
"Sandstone" (granodiorite)	7	40
Ce-Ac 25 (Altitude: 330 feet)		
Crystalline rocks:		
Pump pit	7	7
Granite (granodiorite), gray	108	115
Ce-Ac 30 (Altitude: 325 feet)		
Crystalline rocks:		
Clay	18	18
"Serpentine" and "sandstone"	72	90
Granite (granodiorite), gray	133	223
Ce-Ac 32 (Altitude: 385 feet)		
Crystalline rocks:		
Clay	31	31
Granite (granodiorite), gray	85	116
Ce-Ae 33 (Altitude: 330 feet)		
Crystalline rocks:		
Dug well	38.5	38.5
Granite (granodiorite)	1.5	40
Granite (very hard)	30.5	70.5
Granite, soft streak (water)	2.5	73
Granite, very hard	45	118
Ce-Af 1 (Altitude: 250 feet)		
Crystalline rocks:		
Topsoil	2	2
"Shale" (schist), micaceous, brown	16	18

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
"Shale" (schist), brown to light gray	18	36
"Shale" (schist), micaceous, gray to black	14	50
"Quartz," black-blue	10	60
Ce-Af 4 (Altitude: 300 feet)		
Crystalline rocks:		
Topsoil	1	1
Clay, yellow	22	23
Clay, sandy (water)	15	38
Rock (gabbro), hard, black	56	94
Ce-Af 24 (Altitude: 230 feet)		
Crystalline rocks:		
Topsoil	3	3
Clay, yellow	20	23
Boulders	2	25
Rock (gabbro), very soft (water)	17	42
Rock (gabbro), soft	18	60
Rock (gabbro), medium hard with seams (water)	5	65
Ce-Bb 1 (Altitude: 460 feet)		
Patuxent(?) formation:		
Clay	100	100
Sand	24	124
Gravel	5	129
Ce-Bb 4 (Altitude: 460 feet)		
Bryn Mawr gravel:		
Clay	6	6
Sand and gravel	63	69
Crystalline rocks:		
Rock (granodiorite), sandy	23	92
Ce-Bb 5 (Altitude: 450 feet)		
Patuxent(?) formation:		
Clay	15	15
Clay, sandy	55	70
Gravel	7	77
Ce-Bb 6 (Altitude: 380 feet)		
Crystalline rocks:		
Dirt	16	16
Rock (granodiorite)	20	36
Ce-Bb 7 (Altitude: 460 feet)		
Potomac group:		
Clay, sandy, white	24	24
Clay, red	16	40

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Crystalline rocks:		
Clay, brown	17	57
Rock (granodiorite), soft, brown (water)	22	79
Ce-Bb 8 (Altitude: 440 feet)		
Bryn Mawr gravel:		
Gravel, large	10	10
Gravel, brown	20	30
Sand, brown	15	45
Soil, orange	7	52
Crystalline rocks:		
Granite, black, soft (water)	13	65
Granodiorite (water)	52	117
Ce-Bb 10 (Altitude: 40 feet)		
Crystalline rocks:		
Sand and earth, black	17	17
Rock (granodiorite), hard (water at about 27 ft.)	32	49
Ce-Bb 11 (Altitude: 340 feet)		
Crystalline rocks:		
Clay, brown	46	46
Rock (granodiorite-schist contact), soft brown (water at 50–55 ft.)	19	65
Ce-Bb 21 (Altitude: 15 feet)		
Crystalline rocks:		
Fill, black	7	7
Clay, dark gray	14	21
Rock (granodiorite), gray (water)	3	24
Ce-Bb 22 (Altitude: 15 feet)		
Crystalline rocks:		
Clay, dark gray, with boulders	12	12
Clay, soft, dark gray	11	23
Rock (granodiorite), hard, gray (water)	4	27
Ce-Bc 1 (Altitude: 320 feet)		
Crystalline rocks:		
Dirt	6	6
Rock (schist-gabbro contact)	44	50
Ce-Bc 5 (Altitude: 350 feet)		
Bryn Mawr gravel:		
Clay, brown	3	3
Boulders	2	5
Crystalline rocks:		
Clay, brown	27	32
Rock (granodiorite-schist contact), soft, brown (water at contact)	20	52

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Bc 6 (Altitude: 390 feet)		
Crystalline rocks:		
Clay, brown	4	4
Clay, gray	26	30
Rock (granodiorite), soft, gray, with water-bearing crevice	5	35
Rock (granodiorite), soft, gray, crevices (water: 45–45.5 ft.)	15	50
Ce-Bc 7 (Altitude: 330 feet)		
Crystalline rocks:		
Clay, brown with flint	20	20
Clay, brown	8	28
Clay, light gray	2	30
Rock (granodiorite), soft, gray	5	35
Rock (granodiorite), soft, gray (with water-bearing crevices)	5	40
Rock (granodiorite), soft, gray	16	56
Rock (granodiorite), hard, gray	3	59
Ce-Bc 8 (Altitude: 360 feet)		
Bryn Mawr gravel:		
Gravel	12	12
Crystalline rocks:		
Clay, yellow	11	23
"Granite" brown (soft)	15	38
"Granite" (granodiorite), brown with black stripes (water)	5	43
Ce-Bc 11 (Altitude: 290 feet)		
Crystalline rocks:		
Clay, brown, and boulders	12	12
Rock (metadacite), soft, green	23	35
Rock (metadacite), seamy, green (water)	6	41
Rock (metadacite), gray	2	43
Rock (metadacite), greenish gray	15	58
Ce-Bc 12 (Altitude: 325 feet)		
Bryn Mawr gravel:		
Sand, clay and gravel	60	60
Crystalline rocks:		
Rock (metadacite)	5	65
Ce-Bc 14 (Altitude: 400 feet)		
Bryn Mawr gravel:		
Gravel	18	18
Potomac group:		
Sand	6	24
Clay, tan	6	30
Clay, brown	7	37
Clay, red	8	45

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, orange	3	48
Clay, light gray	6	54
Clay, green with gravel	4	58
Crystalline rocks:		
Rock (metadacite), green (water)	20	78
Rock (metadacite), black (water)	13	91
Ce-Bc 24 (Altitude: 350 feet)		
Bryn Mawr gravel:		
Clay, sandy, brown	39	39
Crystalline rocks:		
Rock (granodiorite-schist contact), rotten, brown (water at contact)	15	54
Ce-Bc 26 (Altitude: 280 feet)		
Bryn Mawr gravel:		
Clay, dark brown, and gravel	10	10
Clay, yellow	16	26
Clay, stiff, gray	4	30
Crystalline rocks:		
Rock (metadacite), soft, gray (water on top of rock)	7	37
Rock (metadacite), moderately hard, gray	9.5	46.5
Streak, soft, greenish (water)	2	48.5
Rock (metadacite), hard, gray	3.5	52
Ce-Bc 28 (Altitude: 200 feet)		
Patuxent formation:		
Clay, light gray	25	25
Clay, brown	4	29
Gravel	.5	29.5
Clay, sandy, brown (water)	34.5	64
Clay, stiff, brown	5	69
Ce-Bc 29 (Altitude: 160 feet)		
Sunderland formation:		
Clay and gravel	18	18
Quicksand	42	60
Crystalline rocks:		
Rock (metadacite)	34	94
Ce-Bc 34 (Altitude: 390 feet)		
Bryn Mawr gravel:		
Clay, stiff, brown, and gravel	25	25
Gravel, wet, large	1	26
Patuxent formation:		
Clay, sandy, brown	9	35

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, wet, whitish	13	48
Clay, brown (water)	12	60
Ce-Bc 35 (Altitude: 400 feet)		
Bryn Mawr gravel and Patuxent formation:		
Sand and gravel mixed	60	60
Patuxent formation:		
Clay, sandy	30	90
Crystalline rocks:		
Rock (metadacite), blue, not very hard	42	132
Ce-Bc 38 (Altitude: 460 feet)		
Bryn Mawr gravel and Patuxent(?) formation		
Gravel (water)	51	51
Ce-Bd 6 (Altitude: 330 feet)		
Potomac group:		
Sand, clay	45	45
Crystalline rocks:		
Rock (metadacite)	20	65
Ce-Bd 7 (Altitude: 370 feet)		
Crystalline rocks:	56	56
"Quicksand" Rock (granodiorite)	11	67
Ce-Bd 8 (Altitude: 350 feet)		
Crystalline rocks:		
Dirt and stone	16	16
Rock (granodiorite)	10	26
Ce-Bd 9 (Altitude: 360 feet)		
Crystalline rocks:		
Dirt and sand (water)	25	25
Rock (granodiorite)	15	40
Ce-Bd 10 (Altitude: 380 feet)		
Crystalline rocks:		
Dirt	10	10
Rock (granodiorite), very hard	40	50
Ce-Bd 12 (Altitude: 85 feet)		
Potomac group:		
Clay, red, and sand	20	20
Sand, white	86	106
Crystalline rocks:		
Rock (granodiorite), blue (water)	86	192

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Bd 13 (Altitude: 40 feet)		
Wicomico formation:		
Clay, sandy	15	15
Clay and shale, soft	45	60
Crystalline rocks:		
Rock (granodiorite), hard, gray, mixed with green	30	90
Ce-Bd 15 (Altitude: 30 feet)		
Wicomico formation:		
Clay, sandy, brown	15	15
Potomac group:		
Clay, red	15	30
Clay, green	3	33
Crystalline rocks:		
Granite (granodiorite), gray	24	57
Ce-Bd 16 (Altitude: 170 feet)		
Potomac group:		
Clay, yellow	7	7
Clay, gritty, yellow	17	24
Clay, yellow and red	10	34
Clay, stiff, yellow and gray	9	43
Crystalline rocks:		
Clay, stiff, gray; rock, soft	22	65
Clay, rocky, stiff	46	111
Rock (granodiorite), soft	31	142
Rock (granodiorite)	3	145
Ce-Bd 17 (Altitude: 180 feet)		
Potomac group:		
Clay, yellow	3	3
Clay, red	4	7
Clay, white	13	20
Clay, sandy, soft, yellow	15	35
Crystalline rocks:		
Clay, sticky, yellow and blue	10	45
Clay, stiff, gray	15	60
Rock (granodiorite), soft	20	80
Ce-Bd 23 (Altitude: 10 feet+)		
Talbot formation:		
Topsoil	7	7
Sand, gravel, and clay	11	18
Potomac group:		
Clay, white and red	4	22
Clay, gray	4	26

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, black	4	30
Clay, yellow and white	3.6	33.6
Sand, coarse, white	4	37.6
Clay, yellow and white	1	38.6
Sand, coarse, yellow and white	2.4	41
Sand, medium, yellow and white	3.6	44.6
Clay, yellow and white	8.4	53
Clay, red and white	5	58
Crystalline rocks (weathered):		
Clay, green, and rock, soft	7	65
Ce-Bd 26 (Altitude: 92 feet)		
Wicomico formation:		
Clay, yellow	10	10
Potomac group:		
Clay, red	30	40
Clay, dark red	10	50
Sand, mica	5	55
Sand, mica (water)	25	80
Clay, pink	5	85
Clay	5	90
Sand, coarse (water)	9	99
Ce-Bd 28 (Altitude: 70 feet)		
Potomac group:		
Clay, sandy, yellow	17	17
Clay, blue and white	11	28
Clay, yellow	9	37
Clay, red	5	42
Clay, brown	6	48
Clay, green, white and purple	4	52
Crystalline rocks:		
Clay, gray, and rock (granodiorite) soft	22	74
Ce-Bd 29 (Altitude: 80 feet)		
Potomac group:		
Clay, yellow	6	6
Clay, sticky, dark red	10	16
Clay, sandy, dark red and white	12	28
Clay, sticky, yellow and gray	8	36
Crystalline rocks:		
Clay, gray	7	43
Rock (granodiorite)	64	107
Ce-Bd 30 (Altitude: 80 feet)		
Patuxent formation:		
Clay, sandy, brown	19	19
Sand, clayey, brown, and gravel (water)	19	38

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Sand, clayey, wet, white	17	55
Sand, clayey, brown	8	63
Sand, coarse, brown, and gravel with clay traces	8	71
Sand, coarse, clean, white, and gravel (water)	3	74
Ce-Bd 31 (Altitude: 40 feet)		
Wicomico formation:		
Clay, yellow	6	6
Clay, blue	4	10
Clay, gray	6	16
Clay, gray, and pieces of stone	6	22
Clay, sandy, coarse, hard, yellow	7	29
Crystalline rocks:		
Clay, stiff, gray	7	36
Clay, stiff, gray, and rock, soft	9	45
Rock (granodiorite), soft	12	57
Rock (granodiorite)	47	104
Ce-Bd 35 (Altitude: 325 feet)		
Crystalline rocks:		
Clay, yellow	10	10
Rock (metadacite), greenish	4	14
Rock (metadacite), hard, gray, (water)	10	24
Ce-Bd 51 (Altitude: 100 feet)		
Potomac group:		
Clay	20	20
Crystalline rocks:		
Rock (granodiorite)	20	40
Ce-Bd 61 (Altitude: 5 feet)		
Patapsco formation:		
Fill	5	5
Clay, gray, fine sand and gravel	9	14
Sand, coarse, yellow and white, gravel and clay	14	28
Sand, coarse, brown	4	32
Sand, medium white; mica	4	36
Clay, white and yellow	1	37
Sand, coarse, yellow	7	44
Clay, white and yellow	12	56
Clay and sand	5	61
Sand, coarse, white, and gravel	13	74
Ce-Be 1 (Altitude: 235 feet)		
Patuxent formation:		
Clay, sandy, yellow	34	34

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Crystalline rocks:		
Rock (granodiorite), hard, gray	31	65
Shale (granodiorite), gray	8	73
Ce-Be 5 (Altitude: 110 feet)		
Sunderland formation:		
Clay, boulders	60	60
Crystalline rocks:		
Rock (granodiorite), gray	5	65
Ce-Be 6 (Altitude: 100 feet)		
Patapsco formation:		
Old well	44	44
Clay, white	11	55
Patuxent formation:		
Clay, white, streaked with sand, white	31	86
Sand, fine, white and brown	8	94
Sand, coarse, white and brown	14	108
Ce-Be 7 (Altitude: 85 feet)		
Potomac group:		
Clay, brown	90	90
Sand, fine, light	5	95
Clay, white	25	120
Clay, black, with petrified wood	10	130
Gravel, coarse, mud-colored (water)	10	140
Sand, white, and gravel, coarse, white	11	151
Ce-Be 8 (Altitude: 120 feet)		
Potomac group:		
Soil, sandy	30	30
Gravel and clay	20	50
Sand, fine, white, with black particles of wood	10	60
Sand, fine, brown	10	70
Sand, coarse	15	85
Ce-Be 9 (Altitude: 100 feet)		
Potomac group:		
Topsoil	3	3
Clay, yellow	17	20
Clay, sandy	10	30
Clay, sandy, and gravel	9	39
Clay, variegated	17	56
Clay, sandy	9	65
Crystalline rocks:		
Rock (granodiorite), soft, with hard streaks (water)	50	115

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Be 16 (Altitude: 215 feet)		
Crystalline rocks:		
Clay, red	16	16
Rock (granodiorite), hard, white	25	41
Ce-Be 21 (Altitude: 24 feet)		
Talbot formation:		
Loam	3	3
Sand and loam	2.5	5.5
Gravel, coarse	1.5	7
Clay and some sand	1	8
Sand, yellow, and clay	3	11
Sand, quartz	2.5	13.5
Sand, coarse, white	13.5	27
Clay below 27 feet.		
Ce-Be 22 (Altitude: 23 feet)		
Talbot formation:		
Loam	4.5	4.5
Sand and loam	2	6.5
Gravel, coarse	1.5	8
Clay and some sand	2.5	10.5
Sand, yellow, and clay	.5	11
Sand, quartz	3.5	14.5
Sand, yellow	7	21.5
Sand, coarse, white	2.5	24
Clay at 24 feet.		
Ce-Be 23 (Altitude: 24 feet)		
Talbot formation:		
Loam	2.5	2.5
Clay, gray	2	4.5
Clay	1	5.5
Sand	2	7.5
Gravel	1.5	9
(Description missing)	3.5	12.5
Clay	1	13.5
Sand and clay	1.5	15
(Description missing)	2	17
Sand, coarse	3.5	20.5
Sand, coarse, white	1.2	21.7
Clay	11.6	33.3
Sand, yellow	2.2	35.5
Sandstone	.5	36
Sand	1	37
Marl, blue	Below 37 feet	

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Be 24 (Altitude: 26 feet)		
Talbot formation:		
Loam	2	2
Gravel	.5	2.5
Earth, sandy	3	5.5
Gravel	1.5	7
Clay	2.5	9.5
Sand, fine	4	13.5
Sand, coarse	5.5	19
(Description missing)	3	22
Ce-Be 26 (Altitude: 155 feet)		
Sunderland formation:		
Clay, dark brown	40	40
Clay, sandy, brown	15	55
Crystalline rocks:		
Clay, green (weathered granodiorite)	30	85
Ce-Be 33 (Altitude: 220 feet)		
Crystalline rocks:		
Clay, yellow	45	45
"Sandstone" (granodiorite), brown	16	61
Rock (granodiorite), hard, brown	6	67
Ce-Be 35 (Altitude: 110 feet)		
Crystalline rocks:		
Clay and pieces of rock (granodiorite)	16	16
Boulder rocks	14	30
Ce-Be 37 (Altitude: 170 feet)		
Potomac group:		
Sand and gravel	40	40
Clay, tan	18	58
Clay, yellow	14	72
Clay, red	11	83
Clay, bright red	7	90
Light yellow(?)	21	111
Sand, fine	3	114
Sand, coarse	2	116
Ce-Be 38 (Altitude: 65 feet)		
Potomac group:		
Dirt	170	170
Crystalline rocks:		
Rock (granodiorite), hard (water)	124	294

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Be 43 (Altitude: 120 feet)		
Potomac group:		
Clay, red	20	20
Sand, gray	30	50
Sand, fine, light (water)	30	80
Gravel, coarse; fine sand, filters through the gravel (water)	10	90
Ce-Be 46 (Altitude: 70 feet)		
Wicomico formation:		
Clay and gravel	20	20
Patuxent formation:		
Clay, yellow	20	40
Clay, yellow, and sand	5	45
Clay, yellow, red, and sand	27	72
Clay, red, white, and sand	8	80
Sand, white, and clay	7	87
Clay, red and white	13	100
Clay, yellow and white	10	110
Clay, red and white, and sand	23	133
Sand, clay, and wood	2	135
Clay, blue, and sand	20	155
Crystalline rocks:		
Rock (granodiorite)	55	210
Ce-Be 47 (Altitude: 40 feet)		
Patapsco formation:		
Sand, gravel, and clay	20	20
Sand, fine, yellow	4	24
Sand, coarse, yellow and white	6	30
Clay, white	1	31
Sand, coarse, yellow and white	8	39
Ce-Be 49 (Altitude: 70 feet)		
Patapsco formation:		
Clay	6	6
Gravel and clay	14	20
Clay, red	20	40
Clay and sand	18	58
Sand	22	80
Ce-Be 54 (Altitude: 130 feet)		
Crystalline rocks:		
Clay, yellow, and gravel	10	10
Rock (granodiorite), hard	36	46

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Be 56 (Altitude: 65 feet)		
Wicomico formation:		
Topsoil and clay	3	3
Patapsco formation:		
Clay, red, white, yellow	18	21
Clay, gray and yellow	13	34
Sand, medium, white	1	35
Clay, white	5	40
Sand, coarse, white	2	42
Clay, white	1	43
Sand and gravel, white, coarse	7	50
Clay, white; sand	20	70
Clay, red	2	72
Clay, white; sand	19	91
Sand, medium, white	1	92
Clay, white; sand	7	99
Sand, coarse, white and yellow	5	104
Clay, white; sand	3	107
Ce-Bf 2 (Altitude: 130 feet)		
Crystalline rocks:		
Loam	2	2
Clay, yellow	12	14
Clay, sandy, blue (wet)	5	19
Rock (gabbro), eroded	7	26
Rock (gabbro), blue seams	30	56
Rock (gabbro), hard, blue	4	60
Ce-Bf 4 (Altitude: 150 feet)		
Sunderland formation:		
Clay, brown	30	30
Crystalline rocks:		
Rock (granodiorite), medium soft, gray (water)	15	45
Rock (granodiorite), hard, gray	3	48
Ce-Bf 5 (Altitude: 160 feet)		
Sunderland formation:		
Clay, brown	39	39
Crystalline rocks:		
Clay, gray	9	48
Rock (granodiorite), soft, gray	4	52
(Water)	1	53
Rock (granodiorite), medium-hard, gray	9	62
Ce-Bf 6 (Altitude: 40 feet)		
Potomac group:		
Clay, brown	40	40

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, wet, brown	5	45
Clay, sandy, brown	46	91
Crystalline rocks:		
Rock (granodiorite?), hard, gray	3	94
Rock, soft, greenish	35	129
Rock, hard, gray	8	137
Rock, soft, greenish (crevice 137′)	13	150
Rock, gray	37	187
Crevice	1	188
Rock, gray	12	200
Ce-Bf 8 (Altitude: 65 feet)		
Wicomico formation:		
Topsoil and clay	6	6
Clay, sandy (water)	28	34
Crystalline rocks:		
Rock (gabbro), soft, gray (water)	75	109
Ce-Bf 20 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil	18	18
Sand, fine, white, and clay	47	65
Patapsco formation:		
Sand, coarse, white	20	85
Ce-Bf 41 (Altitude: 60 feet)		
Wicomico formation:		
Clay, blue	10	10
Sand, very fine, yellow-brown, and silt and clay	9	19
Patapsco formation:		
Clay, red	1	20
Clay, gray	3	23
Clay, red and white	9	32
Clay, light gray to white	3	35
Clay, gray	6	41
Clay, gray with some red	15	56
Clay, red and gray	5	61
Clay, yellow, white, and red variegated	6	67
Clay, red	4	71
Patuxent formation:		
Clay, white, little sand	6	77
Sand, fine	1	78
Clay, soft, gray	5	83
Clay, gray	3	86
Sand, fine to medium	2	88
Clay, soft, gray	3	91
Hard pan	.5	91.5

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, blue, yellow, white, and sand	6.5	98
Quicksand, fine, powdery, tan, and some mud	17	115
Sand, medium, tan	9	124
Ce-Bf 43 (Altitude: 180 feet)		
Patuxent formation:		
Clay, yellow	4	4
Clay, red, grading to sandy clay	66	70
Crystalline rocks:		
Sandstone (granodiorite), brown	28	98
Ce-Bf 44 (Altitude: 120 feet)		
Potomac group:		
Topsoil	3	3
Clay, brown	9	12
Clay, yellow	10	22
Clay, sandy (wet)	13	35
Clay, gray	9	44
Crystalline rocks:		
Rock (gabbro), medium, soft	55	99
Ce-Bf 45 (Altitude: 120 feet)		
Sunderland formation:		
Topsoil	3	3
Potomac group:		
Clay, brown	5	8
Clay, red	10	18
Clay, sand (wet)	27	45
Clay, gray	5	50
Crystalline rocks:		
Rock (gabbro), medium soft	58	108
Ce-Bf 46 (Altitude: 40 feet)		
Potomac group:		
Clay, yellow	11	11
Rock	2	13
Clay, yellow, and rock	17	30
Gravel, coarse, heavy, and stone	3	33
Clay, dark, aluminum-colored	42	75
Clay, sticky, brown, green, and gray	8	83
Crystalline rocks:		
Clay, gritty, gray	10	93
Rock (serpentine), soft, and clay, stiff, gray	52	145
Rock, soft	51	196
Rock, harder	19	215

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Bf 47 (Altitude: 60 feet)		
Wicomico formation:		
Sand, gravel and clay, yellow	20	20
Clay, white, and sand, fine	11	31
Clay, white and yellow, and sand, fine	5	36
Potomac group:		
Clay, purple, white and yellow, and sand, fine	5	41
Sand, medium, white and yellow, and little clay, white and yellow	11	52
Sand, coarse, white	6	58
Sand, coarse, white, and gravel, fine	20	78
Ce-Bf 51 (Altitude: 50 feet)		
Wicomico formation:		
Clay and sand	20	20
Patapsco formation:		
Clay, yellow and red	40	60
Crystalline rocks:		
Rock, soft	20	80
Shale and shell	10	90
Rock (gabbro), soft	30	120
Rock, hard	7	127
Rock, soft, green clay	29	156
Rock, soft	8	164
Ce-Bf 53 (Altitude: 50 feet)		
Wicomico formation:		
Sand, gravel, clay	29	29
Clay, gray	7	36
Patapsco formation:		
Clay, white and yellow; fine sand	18	54
Sand, medium, yellow	2	56
Sand, medium, white	2	58
Clay, white and yellow	2	60
Sand, medium, white and yellow	18	78
Sand, coarse, white	14	92
Ce-Bf 56 (Altitude: 45 feet)		
Wicomico formation:		
Clay, white, gray, yellow; fine sand and gravel	20	20
Patapsco formation:		
Sand, coarse, white	22	42
Sand, coarse, yellow	34	76
Ce-Cc 1 (Altitude: 120 feet)		
Sunderland formation:		
Clay	60	60
Crystalline rocks:		
Granite (granodiorite)	5	65

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Cc 2 (Altitude: 120 feet)		
Sunderland formation:		
Gravel	13	13
Clay, brown, and boulders	15	28
Crystalline rocks:		
Granite (granodiorite), hard, brown (water)	2	30
Ce-Cc 8 (Altitude: 120 feet)		
Sunderland formation:		
Clay, stiff, brown, and gravel	20	20
Clay, brown	25	45
Patuxent formation:		
Clay, sandy, white	40	85
Clay, sandy, brown (water)	15	100
Crystalline rocks:		
Clay, gray	14	114
Rock (granodiorite?), gray	14.5	128.5
Rock (granodiorite?), hard, gray	6.5	135
Ce-Cc 10 (Altitude: 140 feet)		
Sunderland formation:		
Gravel and sand	75	75
Crystalline rocks		
Rock (granodiorite), very hard (very little water)	87	162
Ce-Cc 11 (Altitude: 140 feet)		
Old well	45	45
Crystalline rocks:		
Clay, rock	20	65
Granite (granodiorite), gray	28	93
Ce-Cc 12 (Altitude: 25 feet)		
Potomac group:		
Topsoil	1	1
Sand, yellow	29	30
Clay, white	10	40
Clay, red and white	65	105
Hard pan	.5	105.5
Sand, white	1	106.5
Clay, red and white	1	107.5
Patuxent formation:		
Sand, coarse, white	1.5	109
Clay, white	1	110
Sand, coarse, white	14	124
Ce-Cc 13 (Altitude: 12 feet)		
Potomac group:		
Clay	30	30

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Sand, fine	10	40
Clay, blue	8	48
Sand, coarse	8	56
Ce-Cc 14 (Altitude: 35 feet)		
Wicomico formation:		
Topsoil	1	1
Hard pan	2	3
Potomac group:		
Clay, red-purple, and sand	32	35
Sand, coarse, and clay	23	58
Clay, red and white	42	100
Sand, fine, white, and clay, white	10	110
(Description missing)	11	121
Ce-Cc 15 (Altitude: 70 feet)		
Wicomico formation:		
Clay, brown	4	4
Rock, gravel fill	1	5
Clay, brown	34	39
Gravel, large, mucky	.5	39.5
Patapsco formation:		
Clay, gray	8.5	48
Clay, gray and brown variegated	13	61
Clay, sandy, brown	4	65
Sand, clayey, brown (water)	2	67
Clay, gray	1	68
Clay, reddish brown	8	76
Clay, brown	3	79
Clay, sandy, red (wet)	14	93
Clay, gray	12	105
Indurated sand	.5	105.5
Patuxent formation:		
Sand, clayey, brown (water)	2.5	108
Sand, medium-coarse, clean, brown (water)	8	116
Clay, light gray		116
Ce-Cc 16 (Altitude: 85 feet)		
Crystalline rocks:		
Clay, brown	9	9
Clay, stiff, brown (water)	8	17
Rock (granodiorite), solid, brown	6	23
Rock, soft, brown (water)	4	27
Rock, hard, brown	3	30

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Cc 17 (Altitude: 12 feet)		
Crystalline rocks:		
Clay, brown	13	13
Rock (granodiorite), moderately hard, gray and brown	15	28
Ce-Cc 19 (Altitude: 200 feet)		
Crystalline rocks:		
Clay, brown	19	19
Rock (metadacite), moderately hard, gray	7	26
Seams (water)	3	29
Rock (metadacite), moderately hard, gray	10	39
Ce-Cc 23 (Altitude: 130 feet)		
Sunderland formation:		
Clay, red	35	35
Patuxent formation:		
Clay, light red	12	47
Sand, fine	16	63
Clay, gray	27	90
Crystalline rocks:		
Rock (granodiorite)	27	117
Ce-Cc 28 (Altitude: 50 feet)		
Potomac group:		
Clay, red	23	23
Gravel, fine, and sand	9	32
Clay, red	6	38
Clay, white	16	54
Clay, blue	18	72
Patuxent formation:		
Sand, hard, fine, yellow and white	3	75
Sand, coarse, yellow and white	3	78
Ce-Cc 37 (Altitude: 240 feet)		
Patuxent formation:		
Topsoil	3	3
Clay, yellow	22	25
Crystalline rocks:		
Rock (metadacite), hard, dark, with seams	75	100
Ce-Cd 1 (Altitude: 35 feet)		
Talbot formation:		
Clay, yellow	12	12
Gravel	3	15
Patapsco formation:		
Clay, yellow	40	55

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Sand and clay	10	65
Clay, red	18	83
Patuxent formation:		
Sand and gravel	5	88
Ce-Cd 2 (Altitude: 25 feet)		
Wicomico formation:		
Topsoil	2	2
Clay, sandy (water)	6	8
Patapsco formation:		
Clay, sandy	18	26
Clay, blue	17	43
Sand (water)	21	64
Ce-Cd 3 (Altitude: 25 feet)		
Patapsco formation:		
Gravel	1	1
Topsoil	2	3
Clay, red and white	27	30
Sand, fine	1	31
Clay, red and white	10	41
Sand, fine	4	45
Clay, red and white	2	47
Sand, yellow and white, and clay	15	62
Sand, coarse, white	6	68
Ce-Cd 7 (Altitude: 65 feet)		
Raritan formation:		
Topsoil and fill	8	8
Sand, gravel, and clay	10	18
Clay, red and white	14	32
Sand, coarse, yellow	21	53
Sand, yellow, and clay	11	64
Sand, coarse, yellow, and clay	14	78
Patapsco formation:		
Clay, white and yellow	5	83
Clay, wood, and sand, fine	25	108
Clay, white, and sand, fine	10	118
Sand, medium, white	14	132
Ce-Cd 8 (Altitude: 10 feet)		
Talbot formation:		
Sand, gravel, and clay	18	18
Patapsco formation:		
Clay, white, and sand, fine	25	43
Sand, fine	6	49
Gravel	2	51

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Sand, coarse, yellow	2	53
Sand, coarse, white	6	59
Ce-Cd 9 (Altitude: 25 feet)		
Patapsco formation:		
Clay, yellow	30	30
Sand, white (wet)	18	48
Clay, red	5	53
Sand, yellow; clay	20	73
Clay, gray	17	90
Clay, red	40	130
Sand, gray; clay	10	140
(water)	10	150
Clay, red mixed	10	160
Sand (water)	8	168
Clay, yellow	6	174
Ce-Cd 10 (Altitude: 80 feet)		
Patapsco formation:		
Clay, red	9	9
Sand, fine	8	17
Clay, red	4	21
Sand, fine; a little gravel	4	25
Clay, gray	18	43
Clay, red	14	57
Iron ore, hard	5.5	62.5
Sand, fine	7.5	70
Sand, coarse, yellow	5	75
Sand, medium, white	8	83
Ce-Cd 11 (Altitude: 65 feet)		
Patapsco formation:		
Clay, yellow, and sand, fine	18	18
Clay, hard, yellow and white, and sand, fine	36	54
Sand, fine	3	57
Sand, medium, white	29	86
Ce-Cd 12 (Altitude: 63 feet)		
Patapsco formation:		
Topsoil	2	2
Clay, yellow	10	12
Sand, fine	1	13
Clay, red	11	24
Sand, fine, white	9	33
Clay, red	12	45
Sand, fine, white	83	128
Clay, red	2	130

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Sand, fine	14	144
Clay, tan	7	151
Sand, fine	11	162
Clay, gray	36	198
Clay, light red	12	210
Clay, red	8	218
Patuxent formation:		
Quicksand	11	229
Clay, tan	13	242
Sand and gravel	3	245
Ce-Cd 13 (Altitude: 200 feet)		
Raritan formation:		
Sand and clay	20	20
Clay, red and white	78	98
Hard pan	2	100
Patapsco formation:		
Sand and clay	50	150
Hard pan and sand	5	155
Clay, gray	35	190
Clay, red	50	240
Clay, white	40	280
Sand and clay	50	330
Sand, fine	20	350
Ce-Cd 19 (Altitude: 25 feet)		
Patapsco formation:		
Clay	12	12
Sand and clay	9	21
Clay, gray	22	43
Sand and clay, red, white	20	63
Clay, red and white	2	65
Sand, fine, white	7	72
Sand, fine, and clay	14	86
Sand, coarse, white	6	92
Clay, white	4.7	96.7
Sand, medium, white	7.3	104
Sand, coarse, light	4	108
Ce-Cd 20 (Altitude: 60 feet)		
Patapsco formation:		
Clay, yellow	4	4
Clay, red	15	19
Clay, blue	19	38
Iron ore; clay, blue and red	2	40
Clay, yellow and blue	18	58
Clay, blue	10	68

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, red and blue	27	95
Clay, blue	39	134
Gravel, fine	6	140
Ce-Cd 28 (Altitude: 5 feet)		
Patapsco formation:		
Topsoil	3	3
Sand	12	15
Clay, red	30	45
Sand (water)	11	56
Clay	6	62
Sand, white (water)	4	66
Sand, coarse, white (water)	18	84
Ce-Cd 32 (Altitude: 35 feet)		
Potomac group:		
Clay, yellow	22	22
Clay, red	18	40
Quicksand	18	58
Clay, red	20	78
Clay, yellow	12	90
Patuxent formation:		
Sand, fine	25	115
Sand, coarse	2	117
Ce-Cd 35 (Altitude: 100 feet)		
Wicomico formation:		
Clay; sand; iron ore	18	18
Patapsco formation:		
Clay, white	6	24
Clay, gray	5	29
Clay, white; sand	9	38
Sand; iron ore	3	41
Clay, gray	9	50
Clay, white	30	80
Clay, gray	8	88
Sand, fine, white	9	97
Clay, hard, white	34	131
Clay, hard, gray	21	152
Patuxent formation:		
Iron ore, hard	2	154
Sand, fine, white	15	169
Sand, coarse, white	11	180
Ce-Cc 1 (Altitude: 75 feet)		
Wicomico formation:		
Topsoil	3	3
Clay, sandy	7	10

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Patapsco formation:		
Clay, red	5	15
Clay and gravel (water)	8	23
Ce-Ce 2 (Altitude: 75 feet)		
Potomac group:		
Topsoil	3	3
Clay, sandy	7	10
Clay, red	5	15
Clay and gravel (water)	10	25
Clay, gray	55	80
Clay, sandy, gray (water)	5	85
Clay, gray	35	120
Ce-Ce 3 (Altitude: 20 feet)		
Patapsco formation:		
Clay, red	20	20
Clay, red and white	30	50
Sand, fine	10	60
Clay, red and white	34	94
Sand, hard and clay	10	104
Sand, fine and clay	21	125
Sand, coarse (water)	10	135
Ce-Ce 4 (Altitude: 60 feet)		
Patapsco formation:		
Clay, red, and topsoil	20	20
Clay, red	5	25
Clay, red and white	15	40
Sand, fine, and clay, gray	10	50
Clay, red and white	40	90
Sand, fine	21	111
Sand, fine, white (water)	6	117
Ce-Ce 5 (Altitude: 25 feet)		
Raritan and Patapsco formations:		
Topsoil	1	1
Sand, yellow, and clay	24	25
Clay, white, and sand, fine	15	40
Sand, fine, yellow	10	50
Ce-Ce 22 (Altitude: 15 feet)		
Potomac group:		
Clay, red and white	100	100
Sand, fine, white	95	195
Sand, fine, some coarse, white (water)	6	201

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Ce 24 (Altitude: 60 feet)		
Potomac group:		
Clay, yellow and white	18	18
Clay, red	20	38
Clay, red and white	4	42
Clay, red	24	66
Clay, gray, and wood	29	95
Clay, red and white	7	102
Clay, light gray	6	108
Clay, light gray, and sand, white	21.8	129.8
Clay, hard, and stone, grayish brown	.5	130
Clay, light gray, and sand, white	21	151
Stone, hard, brown	.2	151.5
Clay, red	13.5	165
Clay, red and white; round pebbles	29	194
Clay, red and white, and sand, fine	19.8	213.8
Stone, hard, brown	.2	214
Sand, fine, white	17	231
Sand, medium, white and brown	2	233
Sand, fine, and clay	7	240
Clay, variegated	5	245
Clay and sand, powdered	45	290
Sand, fine, and coarse, white	5	295
Ce-Ce 26 (Altitude: 10 feet)		
Raritan and Patapsco formations:		
Topsoil and clay	3	3
Clay and sand	5	8
Sand, coarse	2	10
Iron ore and sand	7	17
Gravel	2	19
Clay, red and white	4	23
Sand, coarse, yellow and brown	8	31
Sand, coarse and gravel	5.5	36.5
Sand, coarse, yellow, and iron ore	16.7	53.2
Sand, red and brown	2.1	55.3
Sand, red, yellow and brown	5.2	60.5
Sand, coarse, and gravel	2.5	62
Ce-Ce 29 (Altitude: 15 feet)		
Raritan and Patapsco formations:		
Clay, yellow, and gravel	12	12
Clay, red and white	18	30
Sand and clay	4	34
Clay, white and yellow, and sand	30	64
Clay, yellow, and sand	13.5	77.5
(Description missing)	9.5	87

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, red and white	3	90
Sand, fine, white, and wood, rotten	14	104
Mud, sandy, and clay	29	133
Clay, white	25	158
Mud, black, and clay, blue	8	166
Sand, fine, and mud, black	14	180
Clay, red and blue	55	235
Sand, yellow	5.5	240.5
Clay, yellow and blue	1.5	242
Sand, white	3	245
Ce-Ce 34 (Altitude: 35 feet)		
Patapsco formation:		
Sand, gravel and clay	24	24
Sand, gravel, and clay, yellow and gray	18	42
Sand, fine, gray, and clay	8	50
Clay, gray	11	61
Sand, fine, gray	3	64
Sand, fine, gray, and sand, medium	8	72
Ce-Ce 35 (Altitude: 30 feet)		
Patapsco formation:		
Stone and clay, red	18	18
Sand, fine, white, and clay, gray	27	45
Sand, white and brown	9	54
Clay, white, and sand, fine, white	11	65
Clay, gray and white	15	80
Clay, white, and sand, fine, white	46	126
Sand, coarse, white	5	131
Ce-Ce 36 (Altitude: 60 feet)		
Patapsco formation:		
Topsoil, stones and clay	15	15
Sand, white, and clay, white	41	56
Clay, red, and sand, brown	16	72
Clay, light gray	3	75
Clay, dark gray	7	82
Clay, fine, white, gray, and wood	7	89
Clay, white and red	10	99
Clay, gray	28	127
Clay, gray, and sand, white	5	132
Clay, gray; sand, coarse, white; small amount of clay from which water was removed	10	142
Ce-Ce 37 (Altitude: 25 feet)		
Patapsco formation:		
See Ce 24 and 36	140	140

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, gray	32	172
Clay, red and white, and round balls	8	180
Clay, white	5	185
Clay, white, and sand, powdered	10	195
Clay, white and gray	5	200
Clay, gray, and sand, powdered	12	212
Clay, white	4	216
Clay, streaked white, and sand, fine	14	230
Sand, fine, white	8	238
Ce-Ce 38 (Altitude: 25 feet)		
Patapsco formation:		
See Ce 24 and 36	130	130
Sand, fine, white; clay, gray; wood	31	161
Clay, gray	14	175
Clay, white	5	180
Clay, white, and sand, fine, white	2	182
Clay, white and gray	10	192
Clay, gray, and sand, powder	13	205
Clay, variegated	5	210
Sand, fine, white, and clay, white	24	234
Sand, fine, white	8	242
Ce-Ce 40 (Altitude: 20 feet)		
Raritan and Patapsco formations:		
Topsoil	3	3
Sand and clay	7	10
Clay, red, white, and sand	23	33
Clay, white, red, and sand, fine	13	46
Sand, fine	2	48
Hard pan	.2	48.2
Sand, fine, yellow	5.8	54
Ce-Ce 42 (Altitude: 180 feet)		
Raritan and Patapsco formations:		
Topsoil and clay	5	5
Clay and stones	10	15
Sand, brown, and iron ore	30	45
Sand, coarse, brown and white	15	60
Sand, fine, brown and white	20	80
Clay, white	5	85
Sand, brown and white	15	100
Sand, fine	30	130
Clay, gray mixed in red	20	150
Sand, fine, white, and wood	10	160
Clay, red and white	15	175
Clay, gray	15	190

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Sand, fine, and clay in strips	35	225
Sand, hard, fine	30	255
Sand, some coarse, brown and white	9	264
Ce-Ce 43 (Altitude: 20 feet)		
Raritan and Patapsco formations:		
Clay, yellow; large stones	14	14
Sand, fine and coarse, yellow	16	30
Sand, fine, streaks of clay, white	10	40
Clay, red	15	55
Clay, blue	35	90
Clay, dark red and blue	16	106
Clay, white and blue	12	118
Clay, blue	22	140
Clay, white and blue	30	170
Sand, fine, white	5	175
Clay, blue	3	178
Sand, fine, light yellow	4	182
Clay, blue	8	190
Sand, fine, light yellow and white	12	202
Ce-Cf 5 (Altitude: 45 feet)		
Wicomico formation:		
Topsoil, sand and clay	25	25
Magothy and Raritan formations:		
Clay, dark gray	65	90
Raritan formation:		
Clay, dark gray, and sand, brown and white	10	100
Clay, dark gray	22	122
Sand, brown and white (water)	28	150
Ce-Cf 9 (Altitude: 25 feet)		
Raritan and Patapsco formations:		
Clay	8	8
Sand and clay	22	30
Sand, white	21	51
Clay, gray	5	56
Sand, white, and clay	9	65
Clay, gray, white and red	77	142
Sand and clay	16	158
Clay, brown and gray	96	254
Sand, coarse, white	22	276
Ce-Cf 16 (Altitude: 40 feet)		
Wicomico formation:		
Sand and clay	20	20

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Magothy formation:		
Clay, black	13	33
Clay, brown	7	40
Sand and clay	10	50
Raritan formation:		
Clay, red	13	63
Clay, gray	33	96
Clay, brown and green	19	115
Sand and clay	20	135
Sand, white and yellow	12	147
Ce-Cf 17 (Altitude: 60 feet)		
Monmouth and Magothy formations:		
Clay and sand	4	4
(Description missing)	26	30
Sand and wood	20	50
Raritan formation:		
Clay, white	5	55
Clay, red	40	95
Clay, white, brown and gray	40	135
Sand, gray, and hard pan	9	144
Clay, white and gray	40	184
Clay, white	9	193
Sand, white, yellow	9	202
Ce-Cf 19 (Altitude: 40 feet)		
Raritan and Patapsco formations:		
Gravel	10	10
Clay, white	10	20
Clay, fine, white, and sand	10	30
Clay, red	28.5	58.5
Sand, white	5.5	64
(Description missing)	4	68
Clay, white	2	70
Sand, yellow	1	71
Clay, white	22	93
Clay, black	13	106
Sand, white, and clay, black	9	115
Sand, fine, white, and wood	40	155
Sand, coarse	5	160
Clay, red and blue, and wood	26	186
Clay, red, and sand	18	204
Sand, white	3	207
Clay, red, and sand	2.5	209.5
Hard pan	6.5	216
Clay, red, and sand, white	16	232
Sand, light yellow	10	242

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Cf 20 (Altitude: 60 feet)		
Wicomico formation:		
Clay	8	8
Sand, gravel, and clay	18	26
Patapsco formation:		
Clay, gray	2	28
Sand, fine, white, yellow, and clay	10	38
Clay, red, white and gray, and hard pan	51.4	89.4
Hard pan	.6	90
Clay, gray	14	104
Clay, hard, white	2	106
Clay, blue-gray	28.7	134.7
Sand, fine, white	10.3	145
Ce-Cf 28 (Altitude: 78 feet)		
Wicomico formation:		
Clay and sand	25	25
Patapsco formation:		
Sand	3	28
Clay	1	29
Sand and clay	39	68
Clay, red	36	104
Clay, gray and red	97	201
Clay, red, white and gray	69	270
Clay, brown and white	75	345
Sand and wood	8	353
Sand	10	363
Ce-Cf 31 (Altitude: 70 feet)		
Wicomico formation:		
Clay	8	8
Clay, white, and gravel	16	24
Patapsco formation:		
Clay, white, red, and sand	16	40
Sand and clay	22	62
Clay, white, red and brown	49	111
Sand, fine, white	15	126
Gray, red streak, yellow and blue	65	191
Clay, red and blue; streak of sand, fine	19	210
Sand, fine, white	14	224
Clay	2	226
Sand, white	15	241
Ce-Cf 32 (Altitude: 15 feet)		
Raritan formation:		
Clay	10	10
Sand, yellow and clay	16	26

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, gray, and sand	34	60
Clay, gray	27	87
Clay, gray, and sand	11	98
Sand, yellow	10	108
Ce-Cf 33 (Altitude: 15 feet)		
Raritan and Patapsco formations:		
Clay, yellow	10	10
Clay, red, white and blue	32	42
Sand, fine, gray, and wood, rotten	10	52
Sand, fine, white and red	15	67
Sand, fine, gray	8	75
Sand, fine, gray, and clay, blue	29	104
Clay, blue, and mud	11	115
Sand, fine	13	128
Sand, fine, and clay, red and blue	15	143
Sand, yellow and white	6	149
Ce-Cf 34 (Altitude: 10 feet)		
Raritan and Patapsco formations:		
Clay	8	8
Sand and clay	22	30
Sand, white	21	51
Clay, gray	5	56
Sand, white, and clay	9	65
Clay, gray, white and red	77	142
Sand and clay	16	158
Sand, coarse, white	96	254
Clay, brown and gray	22	276
Ce-Cf 46 (Altitude: 80 feet)		
Wicomico formation:		
Soil and clay	3	3
Clay, sand and gravel	14	17
Clay, white and yellow	4	21
Sand, yellow, and gravel	3	24
Patapsco formation:		
Clay, white and gray	7	31
Clay, red and white	24	55
Clay, yellow; sand	9	64
Clay, light blue	39	103
Clay, red	42	145
Clay, yellow and white, and ore	17	162
Clay, gray and red, and sand	2	164
Sand, medium, white	3	167
Sand, coarse, white	7	174
Sand, medium, white	3	177

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Dc 1 (Altitude: 5 feet)		
Potomac group:		
Sand and gravel, large	7	7
Clay, red	5	12
Shale, hard, red; clay streaks	57	69
Clay, soft, red	11	80
Shale, hard, red	23	103
Clay, soft, red	9	112
Black rock and shelf	2	114
Clay, gray	3	117
Clay, brown	34	151
Sand, clayey, brown	5	156
Shale, hard, brown	9	165
Shale, hard, red	40	205
Shale, reddish brown	10	215
Shale, hard brown	19	234
Shale, hard, reddish brown	12	246
Ce-Dd 1 (Altitude: 60 feet)		
Patapsco(?) formation:		
Topsoil	1	1
Sand and gravel	11	12
Clay, red and white	10	22
Sand, fine, yellow	24	46
Clay, red and white	1	47
Sand, fine, yellow	2	49
Clay, red and gray and sand, fine	28	77
Sand, coarse, yellow	6	83
Sand, fine, and clay	42	125
Clay, red and white	85	210
Sand, fine, and clay	20	230
(Description missing)	13	243
Sand, fine, yellow and white	7	250
Sand, fine, white	4	254
Ce-Dd 2 (Altitude: 140 feet)		
Sunderland formation:		
Surface soil	12	12
Magothy formation:		
Clay, white	9	21
Magothy and Raritan formations:		
Clay, pink	42	63
Raritan and Patapsco formations:		
Clay, white	32	95
Clay, blue, and sand	10	105
Clay, blue, and wood	15	120
Clay, blue and pink	39	159

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Sandstone	1	160
Clay, pink and white	42	202
Rock	1	203
Clay, hard, pink	5	208
Sand, fine and coarse	20	228
Clay, hard, pink	4	232
Ce-Dd 3 (Altitude: 15 feet)		
Patapsco(?) formation:		
Topsoil	3	3
Gravel and sand	15	18
Clay, white and gray	62	80
Clay, red and white, and sand, fine, white	33	113
Sand, fine, white	5	118
Clay, red and white	69	187
Clay, red, white and gray; sand, fine; wood	22	209
Clay, red and white, and sand, fine	13.3	222.3
Sand, fine, white	5.7	228
Ce-Dd 6 (Altitude: 25 feet)		
Talbot formation:		
Topsoil	3	3
Gravel, heavy	30	33
Raritan formation:		
Clay, gray and white	36	69
Sand, fine, yellow	15	84
Ce-Dd 13 (Altitude: 70 feet)		
Raritan formation:		
Topsoil	3	3
Gravel and sand	17	20
Clay, black	15	35
Hard pan	.5	35.5
Sand, hard, fine, white	8.5	44
Sand, coarse, white	2	46
Clay, white	1	47
Sand, coarse, white and yellow	20	67
Clay, white	3	70
Hard pan	72.5	142.5
Sand, fine, yellow	5.5	148
Ce-Dd 15 (Altitudes: 60 feet)		
Raritan formation:		
Topsoil	3	3
Gravel and sand	17	20
Sand, fine, and clay, gray	55	75
Sand, fine, yellow	8	83

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Clay, red and white	47	130
Clay, gray, and sand, fine	11	141
Hard pan	.5	141.5
Sand, fine, yellow	8.5	150
Ce-Dd 19 (Altitude: 40 feet)		
Raritan formation:		
Topsoil and sand	20	20
Clay and sand	5	25
Clay, mixed with sand	50	75
Sand, fine, and clay	25	100
Sand, brown (water)	9	109
Ce-Dd 22 (Altitude: 45 feet)		
Raritan formation:		
Sand and topsoil	20	20
Sand, brown	20	40
Sand, white	20	60
Clay, white	30	90
Sand, brown (water)	17	107
Ce-Dd 23 (Altitude: 30 feet)		
Raritan formation:		
Topsoil	3	3
Sand, fine; clay, yellow; gravel	16	19
Clay, white, and sand, fine, white	40	59
Sand, fine, white	20.8	79.8
Clay, white	3	82.8
Sand, fine, yellow	6	89
Ce-Dd 24 (Altitude: 18 feet)		
Raritan formation:		
Topsoil	6	6
Clay, yellow and brown	17	23
Clay, gray	42	65
Gravel, heavy, white	10	75
Sand, fine, white	24	99
Sand, coarse, white	13	112
Ce-Dd 27 (Altitude: 30 feet)		
Raritan formation:		
Topsoil	1	1
Sand and gravel	23	24
Clay, green and sand	32	56
Sand, coarse, green-gray	9	65
Clay, green, and sand	10	75
Sand, fine, yellow	10	85

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Dd 37 (Altitude: 60 feet)		
Raritan formation:		
Old well	80	80
Sand, fine	20	100
Clay, white and red	10	110
Sand, fine (water)	35	145
Ce-Dd 38 (Altitude: 60 feet)		
Raritan formation:		
Topsoil and clay	20	20
Clay, white, gray and yellow	24	44
Sand and clay	9	53
Clay	7	60
Sand, fine, and clay	20	80
Clay, gray	37	117
Sand, fine	9	126
Sand, brown, white (water)	11	137
Ce-Dd 43 (Altitude: 80 feet)		
Raritan formation:		
Open well	32	32
Mud, blue	13	45
Sand, white	20	65
Clay, white	5	70
Clay, white, and sand, white	60	130
Sand, white, yellow, and clay	10	140
Sand, yellow	12	152
(Description missing)	33	185
Ce-Dd 47 (Altitude: 30 feet)		
Wicomico formation:		
Topsoil	15	15
Gravel and sand	10	25
Raritan formation:		
Sand, white, brown, and clay	31	56
Clay, red, white, and sand	17	73
Hard pan	.5	73.5
Clay, red, white, and sand, fine	11.5	85
Sand, coarse, brown	1.2	86.2
Hard pan	.8	87
Sand, fine, yellow	2.5	89.5
Clay, white	.5	90
Sand, yellow	3.8	93.8
Clay, white	1.2	95
Clay, white, and sand, fine	4	99
Sand, fine, white	2	101
Sand, fine, and clay, white	3	104

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Sand, fine, yellow	14	118
Sand, coarse, yellow	10	128
Ce-Dd 49 (Altitude: 100 feet)		
Wicomico formation:		
Soil and gravel	8	8
Magothy formation:		
Sand, soft, gray	19	27
Raritan and Patapsco formations:		
Rock, "granite," medium hard	1	28
Sand, rusty, and clay	11	39
Clay, soft, white; thin streaks of sand, fine	23	62
Sand, fine, white	11	73
Clay, white; thin streaks of sand, fine, white	34	107
Sandstone, rusty	3	110
Sand, medium coarse and fine (water)	29	139
Clay, pink and white, becoming blue	7	146
Ce-Dd 50 (Altitude: 30 feet)		
Raritan formation:		
Topsoil	15	15
Clay, white, and sand, yellow	7	22
Sand, coarse, yellow	3	25
Clay, red, white, gray	21	46
Hard pan	.5	46.5
Sand, fine, white, and clay	16.5	63
Sand, fine, white	12	75
Sand, coarse, white	7	82
Ce-Dd 51 (Altitude: 85 feet)		
Wicomico formation:		
Topsoil	15	15
Sand, coarse, brown and white; some gravel	28	43
Matawan formation:		
Sand, fine, gray, and clay, dark gray, micaceous, some black	12	55
Clay, somewhat sticky, dark gray	56	111
Clay, gray, and sand, fine; tough drilling	4	115
Magothy formation:		
Sand, fine (packed—at 116 hard streak, large pieces of marcasite—at 125 wood and fine sand)	10	125
Sand, hard packed, fine; bits of wood; slow drilling	9	134
Sand, fine packed, coarser	7	141
Sand, coarse	1	142
Sand, fine	3	145
Streaks, sand, coarse, and some gravel	5	150
Gravel	4	154
(Description missing)	5	159

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Dd 61 (Altitude: 20 feet)		
Potomac group:		
Topsoil and gravel	4	4
Sand, coarse, yellow	22	26
Sand, fine, yellow	18	44
Clay, red and white	68	112
Clay, gray, yellow and white	12	124
Clay, white, and sand, fine	19	143
Clay, red	10	153
Clay, red and white	20	173
Hard pan	12	185
Clay, gray	11	196
Sand, fine, white, and wood	16	212
Sand, fine, white, and clay, red, white and gray	42	254
Clay, red and white	10	264
Sand, white	11	275
Clay, red and white, and sand	4	279
Ce-De 1 (Altitude: 70 feet)		
Wicomico formation:		
Topsoil and sand	20	20
Monmouth formation:		
Sand, brown and red	20	40
Sand, brown	20	60
Sand, green and black	20	80
Matawan formation:		
Sand, green and black, and clay	21	101
Matawan and Magothy formations:		
Clay, gray, and sand	73	174
Magothy formation:		
Sand, fine, white	6	180
Sand, coarse, white (water)	8	188
Ce-De 5 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil	1	1
Sand, yellow, and clay	17	18
Monmouth formation:		
Sand, fine, yellow	17	35
Sand, fine, yellow	30	65
Monmouth and Matawan formations:		
Sand, fine, yellow and black	30	95
Ce-De 6 (Altitude: 20 feet)		
Talbot formation:		
Gravel	10	10

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Matawan formation:		
Clay, black, and sand, green	10	20
Matawan and Magothy formations:		
Sand, fine, green, and clay	49	69
Raritan formation:		
Clay, red and white	12	81
Hard pan	1	82
Sand, brown	15	97
Clay, red and white	1	98
Sand, fine, brown	10	108
Clay, red and white	3	111
Sand, brown	5	116
Hard pan	2	118
Sand, fine, yellow	5	123
Hard pan	4	127
Sand, yellow	9	136
Sand, coarse, yellow	6	142
(Description missing)	4	146
Ce-De 7 (Altitude: 10 feet)		
Talbot formation:		
Topsoil and clay, yellow	15	15
Matawan and Magothy formations:		
Clay, black	27	42
Magothy formation:		
Sand, fine, black	14	56
Sand, coarse, white	6	62
Raritan formation:		
Sand, brown and white	1	63
Sand, brown, and clay	1	64
Sand, white, and clay, white	12.5	76.5
Sand, sticky, white, and wood mixed with clay	5.5	82
Sand, fine, white, and clay, gray	7	89
Clay, yellow and brown	23	112
Sand, brown	1.5	113.5
Sand, brown, and clay	.8	114.3
Sand, brown (water)	6.7	121
Ce-De 8 (Altitude: 20 feet)		
Talbot formation:		
Sand, yellow, and topsoil	14	14
Matawan and Magothy formations:		
Clay, black, and shell	57	71
Magothy formation:		
Clay, white; sand; wood	15	86
Clay, black, and wood mixed with sand	14	100
Sand, coarse	9	109

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-De 9 (Altitude: 40 feet)		
Talbot formation:		
Topsoil and sand	4	4
Sand and clay	16	20
Matawan and Magothy formations:		
Clay, black	55.5	75.5
Magothy formation:		
Sand, fine, and clay	8.8	84.3
Sand, coarse, white	1.7	86
Raritan formation:		
Sand, red and white	8.5	94.5
Sand, fine, white, and hard pan	3.5	98
Clay, white	1	99
Sand, fine, white, and clay	4.2	103.2
Sand, coarse, white	3	106.2
Ce-De 10 (Altitude: 20 feet)		
Talbot formation:		
Topsoil	15	15
Matawan formation:		
Clay, gray	30	45
Magothy formation:		
Sand, fine, and wood	6	51
Sand, fine, and wood and clay	33	84
Sand, fine, white	5	89
Sand, coarse, white	9	98
Ce-De 11 (Altitude: 28 feet)		
Talbot formation:		
Sand and clay	18	18
Matawan formation:		
Sandy clay, pale brown, micaceous	7	25
Sandy clay, pale brown; little mica	5	30
Sandy clay, light gray and pale brown, micaceous; wood fragments	5	35
Clay, light gray and pale brown	10	45
Sand, very pale orange; wood fragments	5	50
Magothy formation:		
Sand, light gray, fine sugary; much wood	17	67
Ce-De 16 (Altitude: 20 feet)		
Talbot formation:		
Sand and clay, gray	20	20
Magothy formation:		
Sand, fine, and wood	27	47
Raritan formation:		
Clay, white, and sand	29	76

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Hard pan	1	77
Sand, fine	3	80
Sandstone, hard	1	81
Sand and iron ore	39	120
Sand, brown and white (water)	8	128
Ce-De 17 (Altitude: 70 feet)		
Wicomico formation:		
Topsoil, gravel, and sand	20	20
Matawan formation:		
Clay, gray, and sand, fine	53	73
Hard pan	2	75
Magothy formation:		
Sand, fine, white, and clay	23	98
Sand, coarse, white (water)	9	107
Ce-De 19 (Altitude: 70 feet)		
Talbot formation:		
Clay	8	8
Talbot, Magothy, and Raritan formations:		
Sand and clay	78	86
Raritan formation:		
Clay, gray and red	18	104
Sand	59	163
Ce-Df 1 (Altitude: 70 feet)		
Wicomico formation:		
Sand	1	1
Topsoil and clay	7	8
Sand and gravel	12	20
Monmouth and Matawan formations:		
Sand, fine, and clay	45	65
Matawan formation:		
Clay, green, and sand	25	90
Clay, green	30	120
Raritan formation:		
Clay, red and white	16	136
Clay, red	12	148
Clay, red and white	52	200
Clay, red and white, and sand, fine	23	223
Sand, coarse, white	14	237
Ce-Df 11 (Altitude: 40 feet)		
Talbot formation:		
Topsoil and clay	17	17
Monmouth formation:		
Sand, brown, gray; gravel; little clay	18	35

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Sand, light green, and clay	7	42
Sand and clay, black and green; sand, white and yellow	16	58
Clay, gray, and sand, brown and white	5	63
Sand, soft, gray, white, and shale; little yellow sand	7	70
Matawan formation:		
Sand, hard, gray and white, and shale; little yellow sand	18	88
Ce-Df 14 (Altitude: 65 feet)		
Wicomico formation:		
Clay, yellow, and gravel	24	24
Monmouth formation:		
Sand, black	26	50
Mud, black, and sand, green	22	72
Sand, green and yellow	4	76
Monmouth, Matawan, and Magothy formations:		
Sand, green, and shale and mud	74	150
Magothy formation:		
Sand, hard, gray and white	13	163
Ce-Ec 1 (Altitude: 40 feet)		
Wicomico formation:		
Topsoil	1	1
Gravel, heavy	32	33
Magothy formation:		
Clay, gray	26	59
Sand, fine, brown, white, and clay	12	71
Sand, brown, white	6	77
Sand, coarse, yellow	5	82
Ce-Ec 3 (Altitude: 50 feet)		
Wicomico formation:		
Gravel fill	1	1
Topsoil	5	6
Gravel and sand	16	22
Matawan and Magothy formations:		
Clay, gray, and sand	46	68
Sand, coarse, white	11	79
Ce-Ec 5 (Altitude: 10 feet)		
Talbot and Matawan formations:		
Topsoil and sand	20	20
Magothy formation:		
Clay	20	40
Sand (water)	23	63
Ce-Ec 6 (Altitude: 10 feet)		
Talbot formation:		
Sand and gravel	14	14

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Magothy formation:		
Clay, black	20	34
Sand, coarse, white	21	55
Ce-Ec 7 (Altitude: 10 feet)		
Talbot formation:		
Gravel	3	3
Sand and gravel	18	21
Magothy formation:		
Mud, marsh	19	40
Sand	18	58
Ce-Ec 8 (Altitude: 15 feet)		
Talbot formation:		
Topsoil	1	1
Sand and clay	9	10
Gravel, heavy	11	21
Sand, coarse	13	34
Ce-Ec 9 (Altitude: 40 feet)		
Talbot formation:		
Topsoil	3	3
Sand and gravel	21	24
Sand, yellow, and clay	3	27
Magothy formation:		
Clay, gray	11	38
Clay, gray, and sand	5.6	43.6
Sand, fine	2	45.6
Sand, coarse, white	9.4	55
Gravel	3	58
Ce-Ec 13 (Altitude: 50 feet)		
Talbot formation:		
Topsoil	2	2
Sand, yellow, and gravel	20	22
Matawan and Magothy formations:		
Sand, gray, and clay	22	44
Magothy formation:		
Hard pan	1	45
Sand, white	15	60
Ce-Ec 14 (Altitude: 10 feet)		
Talbot formation:		
Sand	18	18
Magothy formation:		
Clay, black	27	45
Sand, coarse, white	11	56

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Ed 3 (Altitude: 85 feet)		
Wicomico formation:		
Topsoil, sand and stone	20	20
Monmouth formation:		
Sand, fine, gray, and clay	66	86
Matawan formation:		
Sand, coarse, white	8	94
Ce-Ed 4 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil and sand	20	20
Clay and sand	20	40
Monmouth and Matawan formations:		
Sand and clay, gray	40	80
Matawan formation:		
Clay, gray	30	110
Magothy formation:		
Sand, fine, white, and wood	18	128
Sand, coarse, white	9	137
Ce-Ed 14 (Altitude: 50 feet)		
Wicomico formation:		
Clay, yellow, and gravel	18	18
Monmouth and Matawan formations:		
Clay, yellow	29	47
Sand, fine, light yellow	3	50
Sand, dark yellow, and clay	10	60
Matawan and Magothy formations:		
Mud, black, mixed with streaks of sand, fine	91	151
Magothy formation:		
Sand, fine, light yellow	11	162
Sand, coarse, light yellow	13	175
Ce-Ee 3 (Altitude: 70 feet)		
Wicomico formation:		
Clay	10	10
Clay and sand	15	25
Aquia greensand:		
Clay, yellow	40	65
Monmouth formation:		
Sand, yellow, and clay	20	85
Sand, gray, and clay	5	90
Monmouth and Matawan formations:		
Clay, gray	100	190
Matawan formation:		
Clay, black	75	265

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Magothy formation:		
Clay, black, and sand	29	294
Raritan (?) formation:		
Sand, coarse, gray	42	336
Ce-Ec 4 (Altitude: 80 feet)		
Wicomico formation:		
Topsoil and clay	12	12
Clay, white	11	23
Aquia greensand:		
Sand, black, green, brown and white	10	33
Sand, white and brown	17	50
Aquia or Monmouth formation:		
Sand, white, green and black (water)	27	77
Ce-Ec 5 (Altitude: 75 feet)		
Wicomico formation:		
Topsoil	3	3
Sand and gravel	17	20
Aquia greensand:		
Clay, brown, and sand	4	24
Clay, light green, and sand	21	45
Sand, brown, and iron ore and clay	16	61
Sand, brown, and iron ore	18	79
Sand, brown	8	87
Ce-Ec 7 (Altitude: 35 feet)		
Talbot formation:		
Topsoil	1	1
Clay, yellow, and sand	17	18
Aquia greensand:		
Sand, brown and yellow	27	45
Monmouth formation:		
Sand, yellow, brown, and clay, green	8	53
Monmouth and Matawan formations:		
Sand, yellow, white, and clay, green	117	170
Matawan and Magothy formations:		
Clay, green, and sand, black	105	275
Magothy formation:		
Sand, coarse, white	7	282
Ce-Ee 8 (Altitude: 65 feet)		
Wicomico formation:		
Topsoil	1	1
Gravel and sand	21	22

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
Clay, yellow, and sand	6	28
Sand, brown, and clay	20.2	48.2
Sand, fine, brown	7	55.2
Ce-Ee 10 (Altitude: 85 feet)		
Wicomico formation:		
Topsoil	1	1
Sand and clay	17	18
Sand, yellow	27	45
Monmouth formation:		
Sand, fine, yellow and white, and clay	66	111
Matawan formation:		
Sand, black, and clay	17	128
Clay, black	6	134
Sand, fine, white and black	7	141
Ce-Ee 11 (Altitude: 80 feet)		
Wicomico formation:		
Sand and gravel	20	20
Aquia greensand:		
Sand, yellow and black	25	45
Monmouth formation:		
Sand, green and black	30	75
Sand, green, and clay	60	135
Monmouth, Matawan, and Magothy formations:		
Sand, green and yellow, and clay	131	266
Magothy formation:		
Sand, fine, white	8	274
Ce-Ee 12 (Altitude: 75 feet)		
Wicomico formation:		
Topsoil and clay	20	20
Aquia greensand and Monmouth formation:		
Sand, brown	28	48
Sand, green and black	48	96
Sand, green, and clay	22	118
Monmouth and Matawan formations:		
Sand, fine, green and black	66	184
Matawan formation:		
Sand, hard, green and white	10	194
Ce-Ee 28 (Altitude: 80 feet)		
Wicomico formation:		
Topsoil, sand, and clay	45	45

TABLE 48—*Continued*

	Thickness (feet)	Depth (feet)
Monmouth and Matawan formations:		
Sand, clay, dark gray	175	220
Clay, dark gray	44	264
Magothy formation:		
Sand, coarse, white	25	289
Ce-Ef 1 (Altitude: 72 feet)		
Wicomico formation:		
Clay	3	3
Sand and clay	12	15
Aquia greensand:		
Sand, coarse, yellow	16	31

TABLE 49

Drillers' Logs of Wells in Kent County

	Thickness (feet)	Depth (feet)
Ken-Ac 1 (Altitude: 85 feet)		
Wicomico formation:		
Clay	20	20
Sand and clay	20	40
Sand and gravel	50	90
Raritan formation:		
Sand, fine, and clay	30	120
Sand, yellow and white, coarse	17	137
Ken-Ac 3 (Altitude: 80 feet)		
Wicomico formation:		
Topsoil and clay	10	10
Sand, pebbles, stone	68	78
Raritan formation:		
Sand, red and brown	10	88
Sand, white and brown	21	109
Ken-Ac 4 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil, brown sand, and clay	23	23
Pebbles	2	25
Sand, brown	2	27
Sand, white and brown	5	32
Sand, brown, and clay	8	40
Sand, white and brown; pebbles	20	60

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Raritan formation:		
Sand, white and brown	34	94
Sand, white; pebbles	5	99
Clay, white, and sand, fine, white	31	130
Sand, white and brown (water)	11	141
Ken-Ac 5 (Altitude: 70 feet)		
Wicomico formation:		
Clay	12	12
Sand, brown	18	30
Gravel	5	35
Raritan formation:		
Clay, sand, and gravel	45	80
Clay, black	17	97
Sand, fine	12	109
Ken-Ac 6 (Altitude: 30 feet)		
Wicomico formation:		
Topsoil	15	15
Gravel, heavy	5	20
Raritan formation:		
Sand, coarse, white	34	54
Clay, gray	1	55
Sand, yellow and white, fine	20	75
Sand, white, coarse	8	83
Clay, white	3	86
Sand, white, coarse	5	91
Ken-Ac 7 (Altitude: 40 feet)		
Wicomico formation:		
Topsoil	3	3
Wicomico and Raritan formations:		
Sand and gravel, coarse	32	35
Raritan formation:		
Sand, white and black, coarse	8	43
Hard pan	17	60
Sand, white and yellow, coarse	7.5	67.5
Clay, black	3.5	71
Sand, white, coarse	8.8	79.8
Clay, gray and white	1.2	81
Sand, white, coarse	5	86
Ken-Ac 11 (Altitude: 50 feet)		
Wicomico formation:		
Soil, clay, and sand	10	10
Clay, sand, and gravel	13	23

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Raritan formation:		
Sand, coarse	34	57
Clay	2	59
Sand, yellow and white, coarse	31	90
Clay, reddish gray	1	91
Sand, white, coarse	8	99
Sand, yellow and white, coarse	8	107
Ken-Ac 16 (Altitude: 30 feet)		
Wicomico formation:		
Topsoil and sand	25	25
Raritan formation:		
Clay, gray	36	61
Sand and stones (water)	2	63
Ken-Ac 17 (Altitude: 30 feet)		
Wicomico formation:		
Topsoil	3	3
Sand and gravel	22	25
Raritan formation:		
Sand, yellow and white, coarse	40	65
Clay, gray, and sand	5	70
Sand, yellow, fine	11	81
Clay, gray	1	82
Sand, yellow, coarse	4	86
Ken-Ad 2 (Altitude: 75 feet)		
Wicomico formation:		
Clay, yellow	10	10
Clay, yellow, and sand	20	30
Clay, yellow and blue	19	49
Clay, yellow; mixed with sand and gravel	17	66
Magothy formation:		
Clay, yellow and blue; streaks of fine white sand	7	73
Clay, dark blue, soft	34	107
Hard pan	3	110
Sand, yellow, fine, and fine gravel	6	116
Ken-Ad 3 (Altitude: 78 feet)		
Wicomico formation:		
Sand, yellow, and clay	8	8
Clay, yellow	12	20
Sand, gravel, and blue clay	10	30
Clay, soft, yellow and blue	17	47
Clay, yellow; sand and gravel	10	57
Clay and sand, streaks	17	74
Sand, yellow, and gravel	10	84

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Ad 4 (Altitude: 84 feet)		
Wicomico formation:		
Clay, yellow	20	20
Gravel	6	26
Clay, yellow	14	40
Clay, yellow; streaks of sand	15	55
Sand, yellow, hard	14	69
Sand, yellow, coarse	8	77
Ken-Ad 7 (Altitude: 80 feet)		
Wicomico formation:		
Clay	4	4
Sand and gravel	68	72
Matawan formation:		
Clay, black	28	100
Clay, black, and sand	20	120
Magothy formation:		
Clay, blue	29	149
Sand, yellow	20	169
Ken-Ad 8 (Altitude: 20 feet)		
Wicomico formation:		
Clay	10	10
Clay and sand	10	20
Sand, yellow	10	30
Magothy formation:		
Clay, black	30	60
Sand, fine, and clay, black	5	65
Sand, white and yellow, fine and coarse	14	79
Ken-Ad 9 (Altitude: 50 feet)		
Wicomico formation:		
Clay	10	10
Sand, yellow	35	45
Magothy formation:		
Clay, black	15	60
Clay, black, and sand	15	75
Sand, fine, and clay	5	80
Sand, yellow and white, coarse	15	95
Ken-Ad 10 (Altitude: 50 feet)		
Wicomico formation:		
Clay	10	10
Sand and gravel	35	45
Magothy formation:		
Clay, black	23	68
Sand, coarse	25	93

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Ad 17 (Altitude: 70 feet)		
Wicomico formation:		
Topsoil	5	5
Gravel, heavy, and sand, brown	39	44
Matawan (?) formation:		
Sand, brown, fine	3	47
Sand, coarse	3	50
Sand, fine, and clay	3	53
Sand, brown, coarse	21	74
Hard pan	1	75
Magothy formation:		
Clay, gray, and sand, fine	33	108
Sand, coarse, white	12	120
Ken-Ad 18 (Altitude: 84 feet)		
Wicomico formation:		
Topsoil and clay	17	17
Pebbles and sand	25	42
Sand, red and brown, coarse	33	75
Raritan formation:		
Sand, white and brown, coarse	29	104
Clay, brown and gray	6	110
Sand, brown and white, fine	11	121
Sand, white and brown, coarse (water)	6	127
Ken-Ad 21 (Altitude: 40 feet)		
Wicomico formation:		
Topsoil and sand, brown	23	23
Matawan formation:		
Sand, red and brown	15	38
Magothy formation:		
Sand, white, fine, and clay, gray	6	44
Clay, dark gray	16	60
Clay, gray, and sand, fine	13	73
Raritan formation:		
Clay, white	7	80
Clay, red and white	15	95
Clay, red and white; sand	57	152
Sand, white, fine	36	188
Sand, white (water)	7	195
Ken-Ad 32 (Altitude: 70 feet)		
Wicomico formation:		
Topsoil and sand	20	20
Sand; some clay	40	60
Magothy formation:		
Clay; mixed with sand	35	95
Sand, brown and white, coarse (water)	10	105

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Ad 34 (Altitude: 80 feet)		
Wicomico formation:		
Topsoil and clay	5	5
Sand, brown and white	31	36
Clay, brown and white	6	42
Matawan formation:		
Sand, brown, and pebbles	33	75
Magothy formation:		
Clay, dark gray	28	103
Sand, white, fine	7	110
Sand, white, coarse	6	116
Ken-Ad 35 (Altitude: 70 feet)		
Wicomico formation:		
Topsoil	1	1
Clay, yellow, and gravel	21	22
Sand, yellow, and clay	43	65
Sand, yellow	20	85
Ken-Ad 36 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil, clay, and sand	20	20
Matawan formation:		
Sand, brown, and clay	40	60
Sand, brown, and stones	15	75
Magothy formation:		
Clay, gray	40	115
Sand, brown and white	9	124
Ken-Ac 2 (Altitude: 40 feet)		
Talbot, Monmouth, and Matawan formations:		
Gravel, sand, and clay	43	43
Monmouth and Matawan formations:		
Clay, green; sand	45	88
Matawan formation:		
Sand, green and brown	6	94
Ken-Ac 3 (Altitude: 30 feet)		
Talbot formation:		
Topsoil and clay	15	15
Monmouth formation:		
Sand, brown and white	9	24
Sand, brown and white; white clay	9	33
Sand, red and brown, coarse; iron ore	17	50
Sand, brown and white, fine	7	57
Sand, red and brown, coarse; clay	16	73
Clay, dark gray	9	82
Sand, white, fine (water)	14	96

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Ae 4 (Altitude: 65 feet)		
Wicomico formation:		
Topsoil, clay, and sand	25	25
Monmouth formation:		
Sand, white and black, fine	33	58
Matawan formation:		
Clay, dark gray, and sand, brown	23	81
Sand, white, black, brown, and clay	49	130
Clay, dark gray, and sand, fine	10	140
Clay, dark gray	28	168
Matawan and Magothy formations:		
Sand, white and black; streaks of clay (water)	21	189
Ken-Ae 5 (Altitude: 12 feet)		
Talbot formation:		
Topsoil	1	1
Sand, brown, and gravel	21	22
Monmouth formation:		
Sand, brown, and clay	30	52
Clay, gray	3	55
Matawan, Magothy, and Raritan formations:		
Clay, gray, and sand, fine	124	179
Sand, gray, fine, and clay	11	190
Sand, white, coarse	8	198
Ken-Ae 18 (Altitude: 55 feet)		
Wicomico formation:		
Topsoil and clay	22	22
Monmouth and Matawan formations:		
Sand and clay	28	50
Sand, brown	25	75
Matawan formation:		
Sand, green and white	7	82
Ken-Ae 19 (Altitude: 25 feet)		
Talbot formation:		
Topsoil and clay	20	20
Monmouth formation:		
Sand, brown	43	63
Matawan formation:		
Clay and sand, fine	15	78
Sand, green and white	11	89
Ken-Ae 20 (Altitude: 80 feet)		
Wicomico formation:		
Topsoil, brown clay, and sand	25	25

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Monmouth formation:		
Lime, white and brown; sand	45	70
Clay, dark gray, and sand	6	76
Sand, white, brown, black	24	100
Matawan formation:		
Sand, white, black, green	16	116
Ken-Ae 21 (Altitude: 70 feet)		
Wicomico formation:		
Topsoil, brown sand, and clay	25	25
Monmouth formation:		
Lime, white and brown; sand	35	60
Iron ore; red and brown sand; clay	5	65
Clay, dark gray, and sand	11	76
Monmouth and Matawan formations:		
Sand, white, brown, and black (water)	29	105
Ken-Ae 22 (Altitude: 20 feet)		
Talbot formation:		
Topsoil and clay	10	10
Monmouth formation:		
Sand, red and brown; iron ore	53	63
Matawan formation:		
Sand, white and black (water)	16	79
Ken-Ae 23 (Altitude: 20 feet)		
Talbot formation:		
Topsoil and clay	10	10
Monmouth formation:		
Sand, red and brown; iron ore	53	63
Matawan formation:		
Sand, white and black (water)	16	79
Ken-Ae 24 (Altitude: 10 feet)		
Talbot and Monmouth formations:		
Topsoil and brown and white sand	30	30
Matawan formation:		
Sand, gray and white, fine	14	44
Matawan and Magothy formations:		
Clay, dark gray	106	150
Magothy formation:		
Sand, white, powdery	12	162
Sand, fine and coarse	12	174

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Ac 25 (Altitude: 70 feet)		
Wicomico and Monmouth formations:		
Sand and gravel	63	63
Monmouth and Matawan formations:		
Clay, blue	34	97
Matawan and Magothy formations:		
Sand, irony	10	107
Clay	44	151
Sand	19	170
Ken-Ac 26 (Altitude: 15 feet)		
Talbot formation:		
Topsoil	3	3
Monmouth formation:		
Sand, brown, and clay	9	12
Clay, brown	12	24
Sand, green, fine, and clay	21	45
Matawan formation:		
Sand, green, fine	5	50
Ken-Ae 27 (Altitude: 40 feet)		
Wicomico and Monmouth formations:		
Sand, brown and white	30	30
Clay, dark gray; some sand	21	51
Sand, brown, white and green	15	65
Matawan formation:		
Sand, white and gray, fine	41	106
Matawan and Magothy formations:		
Clay, dark gray	64	170
Raritan formation:		
Sand, white, fine	4	174
Sand, white, powder	12	186
Sand, white, coarse and fine	9	195
Ken-Af 1 (Altitude: 70 feet)		
Wicomico formation:		
Sand and clay	25	25
Sand and gravel	15	40
Aquia greensand:		
Sand and clay	10	50
Aquia greensand and Monmouth formation:		
Clay, green	47	97
Monmouth formation:		
Sand and hard pan	10	107
Sand, green and brown	18	125

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Af 2 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil	1	1
Clay, sand, and gravel	8	9
Aquia greensand:		
Sand, dark	6	15
Sand, light	5	20
Clay, dark green, and sand	21	41
Clay, light green, and sand	11	52
Clay, brown, and sand	13	65
Sand, brown and yellow	24	89
Ken-Af 5 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil, clay, and gravel	21	21
Aquia greensand:		
Clay, green, and black and white sand	38	59
Monmouth formation:		
Sand, white and brown, clay	28	87
Sand, white, black, green, and clay	47	134
Matawan formation:		
Clay, green; some sand	4	138
Sand, black and white, fine, and clay	120	258
Magothy and Raritan formations:		
Clay, dark gray	42	300
Hard pan	2	302
Sand, white, fine	2	304
Clay, light gray	12	316
Sand, white	11	327
Ken-Af 15 (Altitude: 65 feet)		
Wicomico formation:		
Soil, sand, and clay	20	20
Aquia greensand:		
Sand and "iron ore"	30	50
Aquia greensand and Monmouth formation:		
Sand, brown	45	95
Ken-Af 16 (Altitude: 70 feet)		
Wicomico formation:		
Topsoil and sand	20	20
Aquia greensand:		
Sand, brown	20	40
Sand and clay	20	60
Sand, fine	44	104

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Af 17 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil, clay, and gravel	17	17
Aquia greensand and Monmouth formation:		
Sand, red, white, brown	28	45
Clay, green; black and white sand	22	67
Clay, dark gray; black and white sand	10	77
Monmouth formation:		
Sand, brown and white; clay	8	85
Clay, light gray; sand, white and black	2	87
Sand, white, black, green	9	96
Sand, brown and white	6	102
Ken-Af 18 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil, sand, coarse gravel, and clay	20	20
Aquia greensand:		
Clay, green	10	30
Clay and sand, mixed	20	50
Sand, red-brown, coarse; some fine sand	27	77
Sand, greenish, black, red-brown, medium and coarse	21	98
Ken-Af 19 (Altitude: 60 feet)		
Dug well	55	55
Aquia greensand:		
Sand, green, brown, black (water)	22	77
Ken-Af 20 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil	1	1
Sand, brown; clay and gravel	17	18
Aquia greensand:		
Sand, brown	52	70
Aquia greensand and Monmouth formation:		
Sand, green; clay	30	100
Monmouth, Matawan, and Magothy formations:		
Sand, black; clay	238	338
Magothy formation:		
Sand, gray, black, fine	11	349
Sand, black and white, fine	8	357
Sand, black, and clay, green	38	395
Raritan formation:		
Sand, white, fine, and clay	10	405
Clay, red	10	415
Sand, black, and clay, green	37	452

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Af 21 (Altitude: 69 feet)		
Aquia greensand:		
Sand, fine, gray; clay	90	90
Sand, medium (water—irony)	20	110
Monmouth formation:		
Clay, blue	30	140
Sand (water)	10	150
Ken-Bb 1 (Altitude: 28 feet)		
Talbot formation:		
Topsoil	3	3
Clay	8	11
Clay and gravel	10	21
Clay, yellow	4	25
Gravel and sand	19	44
Raritan (?) formation:		
Sand, white, yellow, brown	7	51
Sand	14	65
Ken-Bb 2 (Altitude: 16 feet)		
Talbot formation:		
Sand, white, coarse	30	30
Sand, brown, coarse, and gravel	31	61
Ken-Bc 1 (Altitude: 80 feet)		
Wicomico formation:		
Sand and clay	17	17
Sand and gravel (water)	6	23
Monmouth formation:		
Clay	2	25
Sand, black and white, fine (water)	33	58
Ken-Bc 29 (Altitude: 40 feet)		
Talbot formation:		
Topsoil and clay	22	22
Matawan formation:		
Sand, black and white, fine	33	55
Matawan and Magothy formations:		
Clay, dark green and gray	100	155
Magothy formation:		
Hard pan	1	156
Clay, white	2	158
Sand, white	10	168

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Bd 1 (Altitude: 50 feet)		
Wicomico formation:		
Clay, yellow	50	50
Aquia greensand:		
Sand, black, and clay	22	72
Gravel, yellow	8	80
Ken-Bd 2 (Altitude: 70 feet)		
Wicomico formation:		
Topsoil	2	2
Clay, yellow	15	17
Sand, yellow	2	19
Sand, coarse, yellow	15	34
Matawan formation:		
Clay, black, and little sand	11	45
Clay, green, and sand	16	61
Clay, green, and sand, coarse, hard	17	78
Clay, black, and sand	10	88
Sand, green and white	10	98
Ken-Bd 3 (Altitude: 69 feet)		
Wicomico formation:		
Topsoil and sand	20	20
Sand, white	20	40
Monmouth formation:		
Sand, fine, and clay	50	90
Monmouth and Matawan formations:		
Sand, green, white, black (water)	63	153
Ken-Be 1 (Altitude: 60 feet)		
Wicomico formation:		
Gravel	2	2
Clay and sand	10	12
Clay, red	4	16
Clay, yellow, and sand	2	18
Aquia greensand:		
Sand, coarse, brown, and clay	6	24
Sand and clay, brown, fine	23	47
Sand, green, and clay	6	53
Sand, red, and iron ore	3	56
Monmouth (?) formation:		
Clay and sand, brown	21	77
Sand and clay, light green	6	83
Clay and sand, dark green	4.5	87.5
Sand, green, and clay; little shale	14.5	102
Clay, black, and sand	2	104
Sand, coarse, and gravel, fine, gray; little shale	3	107

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Be 19 (Altitude: 72 feet)		
Wicomico formation:		
Topsoil, sand and clay	20	20
Gravel and sand, brown	5	25
Aquia greensand:		
Sand, fine, black and white	30	55
Iron ore and sand, red, brown	20	75
Sand, fine, black, white	30	105
Sand, black, white, and shale	15	120
Sand, black, white, and clay	10	130
Monmouth formation:		
Sand (water)	17	147
Ken-Be 32 (Altitude: 60 feet)		
Wicomico formation:		
Sand and gravel	44	44
Aquia greensand:		
Sand, gray, and clay	52	96
Sand, gray	9	105
Ken-Be 33 (Altitude: 65 feet)		
Wicomico formation:		
Topsoil	2	2
Clay, yellow	19	21
Aquia greensand:		
Sand, fine, yellow and black	52	73
Ken-Bf 1 (Altitude: 30 feet)		
Talbot and Calvert formations:		
Topsoil and sand, white	25	25
Calvert formation:		
Sand, white, and pebbles	5	30
Aquia greensand:		
Clay, light green	6	36
Sand, black, white, and clay, green; hard pan	54	90
Sand, green, black, white, and shale (water)	15	105
Ken-Bf 2 (Altitude: 65 feet)		
Wicomico formation:		
Clay, sand, and gravel	22	22
Calvert formation:		
Clay, gray	17	39
Sand, white, gray, and clay	9	48
Aquia greensand:		
Clay and sand	11	59
Sand, coarse, white, green	6	65
Sand, green and white	30	95
Sand, light green and white, and clay	5	100

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Bf 6 (Altitude: 60 feet)		
Wicomico formation:		
Sand and clay	15	15
Sand and gravel	8	23
Calvert formation:		
Clay, yellow	7	30
Aquia greensand:		
Clay, green, and sand	11	41
Sand, green, black and white	75	116
Monmouth formation:		
Sand, green, black and white, and shale	13	129
Ken-Bf 9 (Altitude: 60 feet)		
Wicomico formation:		
Sand and gravel	40	40
Aquia greensand:		
Clay, blue-black	20	60
Aquia greensand and Monmouth formation:		
Sandstone rock (water)	70	130
Ken-Bf 17 (Altitude: 20 feet)		
Talbot formation:		
Sand, brown, white	11	11
Calvert formation:		
Clay, brown, white	11	22
Sand, white, gray, and stones	6	28
Aquia greensand:		
Clay, dark gray	7	35
Sand, white, green, black, and clay, gray	7	42
Sand, white, green, black, and hard pan	18	60
Sand, white, green, black	25	85
Sand, white, black, and shale (hard pan)	3	88
Sand, white, black, and shale	42	130
Sand, black, white, and shale	32	162
Ken-Bf 18 (Altitude: 25 feet)		
Wicomico formation:		
Topsoil	5	5
Calvert formation:		
Clay, dark gray	15	20
Sand, white, gray	22	42
Aquia greensand:		
Sand, white, black, green, and clay, green; hard pan	38	80
Sand, white, black, green, and clay, green	8	88
Sand, white, black, green, and shale	18	106

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Bf 38 (Altitude: 25 feet)		
Talbot formation:		
Sand and stones	18	18
Calvert formation:		
Clay, green	14	32
Aquia greensand:		
Sand, white, black, green (water)	23	55
Ken-Bf 39 (Altitude: 20 feet)		
Talbot and Calvert formations:		
Sand and stones	39	39
Calvert formation and Aquia greensand:		
Sand, white, green, black, and hard pan	16	55
Sand, white, black, green	30	85
Ken-Bf 40 (Altitude: 20 feet)		
Talbot formation:		
Gravel, sand, clay	40	40
Aquia greensand:		
Clay, blue gray	50	90
Sand rock, gray, black	40	130
Ken-Bf 41 (Altitude: 25 feet)		
Talbot formation:		
Topsoil and sand	20	20
Calvert formation:		
Clay, dark gray	16	36
Aquia greensand:		
Sand, white, black, green; mixed with clay	50	86
Ken-Bg 1 (Altitude: 65 feet)		
Wicomico formation:		
Topsoil and sand	20	20
Sand and gravel	20	40
Aquia greensand:		
Sand, brown, and iron ore	20	60
Sand, fine, brown	25	85
Clay, green, and sand	10	95
Clay, gray	35	130
Sand, brown, white	10	140
Ken-Bg 2 (Altitude: 60 feet)		
Wiconico formation:		
Topsoil, clay, and gravel	15	15
Calvert formation:		
Clay, white, and sand, powder white	15	30
Clay, brown, and sand, brown	5	35
Lime, and sand, white	20	55

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
Clay, dark gray	5	60
Clay, light gray	30	90
Clay, dark gray	28	118
Sand, brown, green and black (water)	22	140
Ken-Bg 26 (Altitude: 65 feet)		
Wicomico formation:		
Topsoil, and clay, sandy, yellow	10	10
Sand, coarse, and gravel	40	50
Thin layers of rock	4	54
Sand, coarse, white	12	66
Sand, coarse, light brown, and gravel, small	9	75
Aquia greensand:		
Sand, fine, rusty	30	105
Sand, medium coarse, rusty	10	115
Sand, fine, rusty	15	130
Monmouth formation:		
Sand, fine, soft, blue	26	156
Sand, fine, tight, blue	11	167
Sand, medium-coarse, green	31	198
Ken-Bg 27 (Altitude: 60 feet)		
Wicomico formation:		
Sand, brown, and clay	11	11
Clay and sand, gray and brown	5	16
Sand, coarse, brown and white	22	38
Sand, coarse, and clay	12	50
Sand, coarse, white and brown (iron ore at 64.5 ft.)	14	64
Aquia greensand:		
Sand, coarse, brown	14	78
Sand; streaks of iron ore	49	127
Sand, fine, brown and white	19	146
Monmouth formation:		
Clay, green, and marl	22	168
Clay, tough	5	173
Sand, medium coarse, brown	32	205
Ken-Bg 28 (Altitude: 65 feet)		
Wicomico formation:		
Clay and sand	16	16
Sand, coarse, white and brown	21	37
Clay, brown	5	42
Sand, coarse, white and brown	4	46
Hard crust	8	54
Sand, coarse white and brown	15	69

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
Sand; streaks of iron ore	14	83
Sand, brown, tight, crusty	53	136
Monmouth formation:		
Sandy clay, green; shells	23	159
Clay, tough, green; shells	7	166
Clay, green	5	171
Sand, white, medium, and coarse, brown	45	216
Clay, and sand, green	17	233
Sandy clay, green	17	250
Ken-Cb 1 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil	1	1
Sand and gravel	23	24
Monmouth formation:		
Hard pan	2.5	26.5
Sand, green, and clay	40.2	66.7
Sand, white	8.3	75
Ken-Cb 2 (Altitude: 40 feet)		
Wicomico formation:		
Topsoil and clay	5	5
Sand, white, and pebbles	60	65
Sand, coarse, brown and white, and stones	5	70
Ken-Cb 22 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil	1	1
Clay, yellow, and sand	3	4
Gravel, heavy	18	22
Hard pan	.5	22.5
Monmouth formation:		
Sand, brown; iron ore; clay	17.5	40
Sand, green, black, and clay	45	85
Matawan formation:		
Sand, green, black	7	92
Sand, green, black, and clay	11	103
Ken-Cb 23 (Altitude: 20 feet)		
Talbot formation:		
Topsoil	1	1
Sand, yellow, and clay	3	4
Gravel, heavy	14	18
Matawan formation:		
Sand, brown, and clay	17	35

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Matawan and Magothy formations:		
Clay, green, and sand, fine	62	97
Magothy formation:		
Sand, coarse, white	20	117
Ken-Cb 30 (Altitude: 35 feet)		
Talbot formation:		
Clay, yellow	10	10
Clay, yellow, and gravel	13	23
Matawan formation:		
Sand, yellow, green, and clay, green	42	65
Clay, green	20	85
Magothy formation:		
Sand, coarse, white	17	102
Ken-Cb 31 (Altitude: 30 feet)		
Talbot formation:		
Clay	12	12
Sand and gravel	3	15
Sand and clay streaks	20	35
Sand and gravel	13	48
Ken-Cb 32 (Altitude: 30 feet)		
Talbot formation:		
Sand and gravel	25	25
Sand, clay, and large gravel	3	28
Sand and clay streaks; large boulders at 35 ft.	7	35
Sand and small gravel	13	48
Monmouth formation:		
Clay, sandy	4	52
Sand, gray	14	66
Ken-Cc 1 (Altitude: 65 feet)		
Wicomico formation:		
Clay, yellow	9	9
Sand, dark yellow	9	18
Sand and gravel	12	30
Sand and gravel, heavy	3	33
Aquia greensand:		
Sand, yellow-gray	12	45
Sand, yellow and brown	9	54
Sand, yellow, and iron ore	11	65
Clay, green and brown, and sand	20	85
Sand, green, black, white, and clay	8	93
Sand, white, yellow and black, and clay, dark yellow	12	105

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Monmouth formation:		
Sand, coarse, white, yellow, black, and clay, gray	5	110
Clay, green, and sand	34	144
Sand, fine, yellow, black, white and brown	7	151
Sand, coarse, white, green and black	5	156
Sand, coarse, white, green, black and gray	6	162
Sand, hard, white, green and black	8	170
Ken-Cc 27 (Altitude: 63 feet)		
Wicomico formation:		
Sand	19	19
Gravel	8	27
Aquia greensand:		
Clay, gray; fine sand	76	103
Sand, very hard; shells	3	106
Sand, gray, firm (water)	55	161
Ken-Cd 1 (Altitude: 65 feet)		
Wicomico formation:		
Sand, yellow, and gravel	20	20
Aquia greensand:		
Sand, fine, and clay layers	55	75
Clay, blue, and shells	35	110
Sand, fine	10	120
Ken-Cd 2 (Altitude: 15 feet)		
Talbot formation:		
Clay, brown	7	7
Clay, dark, and sand and wood	3	10
Clay and sand streaks	5.5	15.5
Clay, tough, brown	4.5	20
Clay, sandy, dark reddish	5	25
Sand, coarse, free, red	5	30
Aquia greensand:		
Sand, free, dark brown and black	6	36
Clay, iron ore, and sand streaks	3.5	39.5
Sand, free, light brown and black	17.5	57
Clay and iron ore	1.5	58.5
Sand, free, red	7	65.5
Shells and clay, sandy, black	8.5	74
Sand, black	3	77
Sand, tight, black	5	82
Ken-Cd 3 (Altitude: 15 feet)		
Talbot formation:		
Clay, soft, yellow	6	6
Marl, soft, yellow; shells	54	60

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
Marl, soft, gray; shells	53	113
Marl, soft, black; hard boulders	16	129
Monmouth formation:		
Marl, hard and soft, alternating green and black	21	150
Sand, hard, dark brown	50	200
Matawan formation:		
Sand, gray and black (water, 15 gpm)	30	230
Clay, gray, and sand	21	251
Sand, soft gray; rock	6	257
Clay, black, sandy, hard	11	268
Magothy formation:		
Clay, soft, black, loamy, micaceous	64	332
Sand, white, coarse, soft (water, 20 gpm.)	3	335
Clay, soft, lead-colored	5	340
Sand, white, coarse, soft (water)	4	344
Raritan formation:		
Clay, soft, alternating red and white	11	355
Sandy clay, soft, alternating red and white	35	390
Sand, reddish, loose, free (water)	5	395
Sandy clay, soft, red	26	421
Clay, red, hard	59	480
Sand (?), soft; rock	.5	480.5
Sand (water)	1	481.5
Clay, soft, gray	10.5	492
Rock, very hard	.5	492.5
Clay, gray, tough, sticky	47.5	540
Sandy clay, hard, gray	10	550
Sand, white, free (water, 80 gpm.)	31	581
Patapsco formation:		
Sandy clay, soft, gray	44	625
Sandy clay, red and white, very hard	7	632
Boulder, hard	.5	632.5
Clay, light pink, tough	15.5	648
Clay, red, tough	52	700
Sandy clay, gray, alternating hard and soft	6	706
Sand, white, coarse (water)	7	713
Clay, purple, tough	37	750
Clay, red, tough	205	955
Patuxent formation:		
Clay, purple, soft; hard boulders	26	981
Clay, purple, very hard	21	1,002
Sand, coarse, reddish, free (water, flows 14 gpm)	2	1,004
Clay, soft, gray	19	1,023
Clay, red, somewhat hard	27	1,050
Clay, soft, gray	6	1,056
Clay, gray, very hard	4	1,060
Clay, red, soft	40	1,100

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Sandy clay, soft, gray; boulders	8	1,108
Sandy clay, soft, gray	2	1,110
Sandy clay, soft, gray; large boulder	25	1,135
Sand, coarse (water, flows 50 gpm, very salty)	—	1,135
Ken-Cd 4 (Altitude: 60 feet)		
Wicomico formation:		
Soil and sand	23	23
Gravel, coarse, and boulders	14	37
Aquia greensand:		
Clay	22	59
Sand, yellow (water)	13	72
Ken-Cd 6 (Altitude: 65 feet)		
Wicomico formation:		
Topsoil	2	2
Clay	10	12
Sand and gravel	7	19
Aquia greensand:		
Sand, dark brown; little glauconite	21	40
Sand, dark brown; iron ore; clay	7	47
Sand, white and yellow, and clay	13	60
Sand, green, white, yellow, and black	12	72
Ken-Cd 12 (Altitude: 12 feet)		
Talbot formation:		
Topsoil	22	22
Aquia greensand:		
Sand (water)	5	27
Ken-Cd 13 (Altitude: 20 feet)		
Talbot formation:		
Topsoil and clay	10	10
Sand, brown, and stones	10	20
Aquia greensand:		
Sand, red and brown	20	40
Clay, brown	15	55
Clay, brown, and sand	49	104
Sand, black, and shale and clay, green	30	134
Sand, brown, and clay	12	146
Monmouth formation:		
Sand, fine, black and white	20	166
Ken-Cd 14 (Altitude: 35 feet)		
Wicomico formation:		
Topsoil; clay, gray; sand	22	22

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
Iron ore and stones	8	30
Sand, brown and white (water)	33	63
Ken-Cd 15 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil and sand	20	20
Sand and gravel	20	40
Aquia greensand:		
Sand, brown, and iron ore	20	60
Sand, fine, brown	25	85
Clay, green, and sand	10	95
Clay, gray	35	130
Sand, brown and white (water)	10	140
Ken-Cd 16 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil and clay	20	20
Sand, brown	20	40
Aquia greensand:		
Sand, fine, and iron ore	35	75
Sand, coarse	7	82
Ken-Cd 21 (Altitude: 40 feet)		
Talbot and Wicomico formations:		
Sand and clay, yellow, hard	8	8
Clay, yellow	7	15
Clay, black, soft	7	22
Sand and gravel	6	28
Aquia greensand:		
Sand and yellow clay	10	38
Sand and red clay	5	43
Sand, yellow and black	7	50
Sand, red	13	63
Sand, coarse, yellow and black	17	80
Sand, fine, yellow and black	18	98
Sand, green and black	10	108
Sand, coarse, yellow	20	128
Ken-Cd 23 (Altitude: 15 feet)		
Talbot formation:		
Topsoil and sand	15	15
Clay, gray	14	29
Sand, coarse, gray and white, and clay, white	1.5	30.5
Clay, gray	34.5	65
Sand, gray and white; wood and shells	2	67

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
Clay, gray, brown and blue	9	76
Sand, green, black, white, and shells	19	95
Very hard layers (drilling stopped)		95
Ken-Cd 24 (Altitude: 60 feet)		
Wicomico formation:		
Sand, yellow, and clay	47	47
Aquia greensand:		
Clay, soft	33	80
Sand, coarse, gray	7	87
Ken-Cd 25 (Altitude: 15 feet)		
Talbot formation:		
Topsoil and sand	20	20
Stones	5	25
Aquia greensand:		
Sand, fine, brown	15	40
Sand, brown, and iron ore	18	58
Sand, coarse, brown (water)	8	66
Ken-Cd 26 (Altitude: 15 feet)		
Talbot formation:		
Topsoil and sand	20	20
Clay	2	22
Aquia greensand:		
Sand and clay	43	65
Sand, fine	10	75
Sand, black, white, brown	10	85
Ken-Cd 27 (Altitude: 20 feet)		
Talbot formation:		
Topsoil and clay	5	5
Sand, brown, and stones	15	20
Aquia greensand:		
Sand, brown, and clay	40	60
Sand, coarse, brown; some fine, black (water)	10	70
Ken-Cd 28 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil, sand, and stones	20	20
Sand and clay mixed	20	40
Aquia greensand:		
Sand, brown, black and white	35	75

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Cd 31 (Altitude: 25 feet)		
Aquia greensand:		
Sand, fine	21	21
Sand, coarse, yellow	7	28
Sand, white	9	37
Clay, blue	49	86
Sand (water)	14	100
Ken-Cd 32 (Altitude: 42 feet)		
Talbot formation:		
Clay, brown	19	19
Sand and gravel	9	28
Aquia greensand:		
Clay and iron ore	14	42
Sand, light brown	21	63
Clay	15	78
Sand, gray and black	23	101
Clay	9	110
Crusts and hard places	8	118
Sand	23	141
Clay	2	143
Ken-Cd 33 (Altitude: 16 feet)		
Talbot formation:		
Sand and iron ore; a little gravel	22	22
Aquia greensand:		
Sandy clay, yellow; iron ore	7	29
Sand, brown; gray clay	8	37
Sand, brown; gray-green clay	10	47
Sand, black, brown, fine	17	64
Gravel, brown, white, fine	2	66
Sand, coarse	4	70
Sand, brown, coarse	6	76
Sand, black, coarse; shells	12	88
Clay, gray-green	7	95
Ken-Cd 34 (Altitude: 40 feet)		
Talbot formation:		
Clay	4	4
Gravel	5	9
Sand, red	25	34
Sand, coarse, and gravel	1	35
Gravel	1	36
Aquia greensand:		
Sand, fine	6	42
Clay; iron ore	1	43
Sand	4	47

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Clay; iron ore	1	48
Sandy clay	9	57
Sand	2	59
Clay; iron ore	1	60
Sand	4	64
Clay; iron ore; sand streaks	9	73
Sand	6	79
Clay; iron ore	2	81
Gravel	5	86
Clay	20	106
Sand	17	123
Clay	2	125
Sand	7	132
Ken-Cd 40 (Altitude: 8 feet)		
Talbot formation:		
Clay; clay and wood	25	25
Sandy clay, hard	5	30
Aquia greensand:		
Sand, hard	12	42
Hard streak	1	43
Sand, hard	17	60
Sand, hard streaks	8	68
Sand and shells	5	73
Clay and shells	4	77
Ken-Cd 41 (Altitude: 4 feet)		
Talbot formation:		
Clay; clay and wood	20	20
Aquia greensand:		
Sand, fine, hard	20	40
Sand	9	49
Iron crust	1	50
Sand, hard, streaks	5	55
Sand and shells; clay	12	67
Ken-Db 1 (Altitude: 15 feet)		
Talbot formation:		
Clay	8	8
Sand and clay	12	20
Sand, gray	20	40
Monmouth formation:		
Clay, blue, and sand	20	60
Clay, gray, and sand	20	80
Clay, black	16	96
Matawan formation:		
Sand, gray, green, white, and black	24	120

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Db 2 (Altitude: 8 feet)		
Talbot formation:		
Clay	8	8
Clay and sand	12	20
Clay, blue	5	25
Sand and gravel	15	40
Monmouth and Matawan formations:		
Sand, green and gray	62	102
Clay	78	180
Clay, black, and sand	10	190
Magothy formation:		
Sand, gray	12	202
Ken-Db 3 (Altitude: 15 feet)		
Talbot formation:		
Clay, sandy	7	7
Sand, fine	5	12
Clay, gray	10	22
Sand, fine	12	34
Clay	3	37
Gravel, dark gray, white; wood	15	52
Clay, gray	8	60
Monmouth formation:		
Sand, green	5	65
Clay, green	16	81
Sand	4	85
Clay	5	90
Sand	8	98
Sand, free	30	128
Ken-Db 4 (Altitude: 10 feet)		
Talbot formation:		
Clay	10	10
Aquia greensand:		
Sand	30	40
Clay	60	100
Monmouth formation:		
Sand (water)	18	118
Ken-Db 5 (Altitude: 25 feet)		
Talbot formation:		
Topsoil and sand	12	12
Sand, fine, white, and clay	33	45
Aquia greensand:		
Clay, dark gray	41	86
Monmouth formation:		
Sand, black, white (water)	10	96

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Db 13 (Altitude: 15 feet)		
Talbot formation:		
Topsoil and clay	20	20
Gravel and clay	3	23
Aquia greensand:		
Sand, brown, and clay	27	50
Sand, green, and clay	5	55
Sand, brown, and clay	25	80
Sand, fine, white and black	21	101
Monmouth formation:		
Sand, black, white, and shale (salty water)	38	139
Monmouth and Matawan formations:		
Sand, black and white (salty water)	31	170
Matawan formation:		
Sand, brown, white, green (salty water)	27	197
Sand, white and gray (salty water)	9	206
Sand, fine, black and white	9	215
Clay, dark gray	5	220
Clay and sand, white, green, and brown	15	235
Sand, white and black	25	260
Ken-Db 15 (Altitude: 10 feet)		
Talbot formation:		
Topsoil and sand	20	20
Aquia greensand:		
Clay and sand	10	30
Sand, fine	21	51
Hard pan	1	52
Monmouth formation:		
Sand, fine, green and white	70	122
Sand, green, white (water)	17	139
Ken-Db 16 (Altitude: 10 feet)		
Talbot formation:		
Topsoil and sand	20	20
Aquia greensand:		
Sand, brown	20	40
Aquia greensand and Monmouth formation:		
Sand, fine, green, black	80	120
Monmouth formation:		
Sand, green, white (water)	17	137
Ken-Db 17 (Altitude: 10 feet)		
Talbot formation:		
Topsoil and sand	20	20
Aquia greensand:		
Sand, fine	50	70

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Monmouth formation:		
Sand, fine, black and green	64	134
Sand, green and white	14	148
Ken-Db 18 (Altitude: 10 feet)		
Talbot formation:		
Topsoil and sand, fine, white	18	18
Aquia greensand:		
Clay, gray	12	30
Monmouth formation:		
Sand, gray	5	35
Clay, light gray	15	50
Sand, fine, white	10	60
Sand, coarse, white and brown	10	70
Ken-Db 19 (Altitude: 18 feet)		
Talbot formation:		
Topsoil and clay, brown, and sand	15	15
Clay, dark gray	10	25
Sand, fine, white and gray	5	30
Aquia greensand and Monmouth and Matawan formations:		
Clay, dark gray, and shale	90	120
Matawan formation:		
Sand, fine, white and black (water)	10	130
Ken-Db 34 (Altitude: 20 feet)		
Talbot formation:		
Sand, medium, yellow, and clay	12	12
Clay, tough, gray	8	20
Sand, medium and coarse, gray; grit and gravel; some ironstone	6	26
Sand, medium and coarse, brown and white	3	29
Clay, gray; some sand	10	39
Sand, medium and coarse, gray	5	44
Sand, coarse, gray; streaks of clay, green, and silt	8	52
Same; also wood	8	60
Aquia greensand:		
Sand, medium and coarse, green and black	12	72
Same, darker	8	80
Sand, medium and coarse, black and green; shells	7	87
Sand, dark green and brown; some clay	5	92
Sand, dark green and black (glauconite); abundance of shells	5	97
Monmouth information:		
Sand, medium to coarse, gray and green	2	99
Sand, dark green with shells and thin streaks; sand fine, clayey, gray	6	105
Sand, black, green; bits of fine, clayey gray sand; fewer shells	3	108

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Sand, medium and coarse, light gray, green and black; streaks of green, clayey sand; few shells	8	116
Sand, medium to coarse, green, black; very little clay; no shells; bits of sand, fine	13	129
Matawan formation:		
Sand, medium to coarse and bits of fine, changing from dark green to light greenish tan	7	136
Sand, medium to coarse, light greenish tan, and shells	5	141
Sand, medium but mostly coarse, light greenish tan, and shells	11	152
Same, somewhat less coarse	8	160
Ken-Db 35 (Altitude: 15 feet)		
Talbot formation:		
Clay	12	12
Aquia greensand:		
Sand, coarse, white, green, and clay	26	38
Sand, fine, green, white	15	53
Sand, coarse, white, green, and clay	3	56
Monmouth formation:		
Sand, dark green, and clay, white, gray	25	81
Sand, green, white, and clay	6	87
Monmouth and Matawan formations:		
Sand, gray and white; little clay, green	77	164
Sand, coarse, white, yellow, gray, green, and clay	17	181
Sand, fine, gray, white	13	194
Magothy formation:		
Sand, fine, gray, white; clay, black	9	213
Sand, medium, white and gray	12	225
Sand, medium, white, gray and green	7	232
Raritan formation:		
Clay, wood, and sand	2	234
Sand, fine and medium, white, gray, and wood	34	268
Sand, medium, light yellow	22	290
Ken-Dc 1 (Altitude: 9 feet)		
Talbot formation:		
Clay	4	4
Sandy	3	7
Gravel	1	8
Aquia greensand:		
Sand (water)	8	16
Clay, tough	4	20
Sand and clay streaks	11	31
Sand, free	4	35
Clay, tough	5	40
Rock, soft	47	87

TABLE 49—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Dc 2 (Altitude: 15 feet)		
Talbot formation:		
Soil and loam	20	20
Clay	33	53
Gravel, coarse, and clay, fine	17	70
Aquia greensand:		
Sand, white (salty water at 80 ft)	10	80
Ken-Dc 3 (Altitude: 20 feet)		
Talbot formation:		
Topsoil and clay, brown	20	20
Aquia greensand:		
Sand, brown, and clay	22	42
Sand, brown and black, and clay	26	68
Sand, brown and black	10	78
Ken-Dc 13 (Altitude: 15 feet)		
Talbot formation:		
Topsoil and sand	20	20
Aquia greensand:		
Clay, yellow	5	25
Sand, brown, red, black specks	37	62
Ken-Dc 14 (Altitude: 10 feet)		
Talbot formation:		
Topsoil and sand	20	20
Aquia greensand:		
Sand, brown, red mixed with clay	55	75
Hard pan; sand, green and white	2	77
Sand, soft, black, green and white	31	108
Sand, hard, green, white and black	11	119
Sand, green, black, white	38	157

TABLE 50

Driller's Logs of Wells in Queen Annes and Talbot Counties

	Thickness (feet)	Depth (feet)
QA-Ag 2 (Altitude: 20 feet)		
Talbot formation:		
Topsoil, stones, and clay	20	20
Calvert formation:		
Clay, gray	11	31
Aquia greensand:		
Sand, black, white, and green (water)	47	78

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Ag 3 (Altitude: 15 feet)		
Talbot formation:		
Sand and topsoil	20	20
Aquia greensand:		
Sand, green	15	35
Stones	3	38
Sand, green and white (water)	18	56
QA-Ag 4 (Altitude: 41 feet)		
Talbot formation:		
Sand, yellow, and gravel	36	36
Calvert formation:		
Clay, blue-black	24	60
Sand rock	7	67
QA-Be 3 (Altitude: 42 feet)		
Wicomico formation:		
Topsoil and clay	20	20
Sand and clay	20	40
Aquia greensand:		
Sand, brown, and iron ore	45	85
Sand, coarse, brown	6	91
QA-Be 4 (Altitude: 40 feet)		
Wicomico formation:		
Topsoil and clay	5	5
Sand, brown and red	13	18
Clay	7	25
Aquia greensand:		
Sand, red and brown	30	55
Iron ore, clay, sand and hard pan	21	76
Sand, red, brown and white	10	86
QA-Be 5 (Altitude: 40 feet)		
Wicomico formation:		
Topsoil	3	3
Clay, yellow, and gravel	15	18
Sand, coarse, white	6	24
Sand, fine, yellow	21	45
QA-Be 6 (Altitude: 10 feet)		
Wicomico formation and Aquia greensand:		
Clay and sand, yellow	38	38
Sand, yellow	9	47

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Bf 2 (Altitude: 28 feet)		
Sand, yellow, and gravel	20	20
Calvert formation:		
Clay, dark	25	45
Aquia greensand:		
Sand, coarse, gray	10	55
QA-Bf 5 (Altitude: 29 feet)		
Talbot formation:		
Sand, yellow	30	30
Aquia greensand:		
Sand, fine, gray, and clay	60	90
Sand, coarse, gray	20	110
(Description missing)	10	120
QA-Bf 6 (Altitude: 60 feet)		
Wicomico formation:		
Sand and gravel	23	23
Calvert formation:		
Clay, gray	31	54
Sand	9	63
Clay	11	74
Aquia greensand:		
Sand, hard	32	106
QA-Bf 7 (Altitude: 80 feet)		
Wicomico formation:		
Sand, yellow	35	35
Calvert formation:		
Clay, dark, and sand layers	45	80
Aquia greensand:		
Sand, hard cemented, black	60	140
QA-Bg 2 (Altitude: 50 feet)		
Talbot formation:		
Sand and gravel	15	15
Calvert formation:		
Clay, brown and white	5	20
Clay, light gray	15	35
Clay, dark gray	25	60
Aquia greensand (?):		
Clay, green, and sand, black, green, and white	31	91
Sand, black, green and white (water)	16	107
QA-Bg 3 (Altitude: 20 feet)		
Talbot formation:		
Sand, yellow, and gravel	30	30

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Calvert formation:		
Clay, blue	8	38
Aquia greensand:		
Sandstone rock (water)	65	103
QA-Bg 4 (Altitude: 20 feet)		
Open well	30	30
Aquia greensand:		
Sand	8	38
Clay and sand, brown	8	46
Sand, green and white	34	80
Sand, green and white (water)	12	92
QA-Bg 5 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil, sand, and clay	5	5
Sand, white, brown, and stones	30	35
Calvert formation:		
Sand, brown and white; lime	15	50
Clay, white, and pebbles	5	55
Clay, light gray	15	70
Clay, dark gray	30	100
Aquia greensand:		
Sand, black, and clay, dark gray	22	122
Sand, white, brown, black, and gray (water)	31	153
QA-Bg 6 (Altitude: 68 feet)		
Wicomico formation:		
Sand, yellow, and gravel	48	48
Calvert formation:		
Clay, blue-gray (water encountered in crack in blue clay)	37	85
QA-Cd 1 (Altitude: 23 feet)		
Talbot formation:		
Sand, yellow, and clay and gravel	37	37
Calvert formation:		
Clay, sticky gray	41	78
Gravel, coarse	8	86
Clay, blue	7	93
Aquia greensand:		
Sand, cemented (water)	15	108
QA-Ce 1 (Altitude: 60 feet)		
Wicomico and Calvert formations:		
Clay, yellow, and sand	31	31
Calvert formation:		
Clay, soft, black	59	90
Clay, blue	50	140

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Eocene series (undifferentiated):		
Clay, soft, and sand	13	153
Sand, tough, gray	42	195
Aquia greensand:		
Sand, hard gray	23	218
QA-Ce 2 (Altitude: 40 feet)		
Wicomico formation:		
Sand, yellow, and gravel	25	25
Calvert formation:		
Sand, dark, with interbedded blue clay	65	90
Clay	15	105
Aquia greensand:		
Sand, hard, dark (water)	65	170
QA-Ce 3 (Altitude: 50 feet)		
Wicomico formation:		
Clay and sand, fine	26	26
Calvert formation:		
Clay, gray	44	70
Clay, blue	20	90
Aquia greensand:		
Sandrock, gray	44	134
QA-Ce 4 (Altitude: 24 feet)		
Talbot formation:		
Old pit	10	10
Clay	10	20
Aquia greensand:		
Sand, fine	30	50
Sand, coarse, brown (water)	42	92
QA-Ce 24 (Altitude: 70 feet)		
Wicomico formation:		
Sand	20	20
Sand and gravel	20	40
Calvert formation:		
Sand	20	60
Clay	94	154
Aquia greensand:		
(Water)	26	180
QA-Cf 1 (Altitude: 40 feet)		
Wicomico formation:		
Sand, yellow, and loam	21	21
Sand, coarse, and gravel	14	35

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Calvert formation:		
Clay, blue	34	69
Shells and sand	12	81
Clay, blue	59	140
Aquia greensand:		
Sand, hard (water)	20	160
QA-Cf 2 (Altitude: 42 feet)		
Wicomico formation:		
Sand, yellow, and gravel	30	30
Calvert formation:		
Clay, dark	35	65
Sand and gravel	10	75
Sand and clay	55	130
Aquia greensand:		
Sand, hard	35	165
(Description missing)	5	170
QA-Cf 3 (Altitude: 40 feet)		
Wicomico formation:		
Sand and gravel	21	21
Calvert formation:		
Sand, gray, and clay	53	74
Clay, blue	61	135
Aquia greensand:		
Sandrock, gray	55	190
QA-Cf 4 (Altitude: 40 feet)		
Wicomico formation:		
Sand, yellow, and gravel	28	28
Calvert formation and Aquia greensand:		
Clay, blue	62	90
Sand, gray	10	100
Clay	30	130
Aquia greensand:		
Sand, hard, gray	50	180
QA-Cf 5 (Altitude: 68 feet)		
Wicomico formation:		
Clay	4	4
Sand, yellow	22	26
Sand, yellow, and gravel	10	36
Sand, white, and gravel	9	45
Calvert formation:		
Sand, gray	5	50

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Cf 6 (Altitude: 67 feet)		
Wicomico formation:		
Sand and clay	9	9
Clay and little sand	9	18
Sand; gravel, white; clay, yellow	21	39
Calvert formation:		
Sand, yellow and white	11	50
Clay, yellow	2	52
Eocene series (undifferentiated):		
Clay, green	18	70
Clay, green, and shells	22	92
Clay, green	12	104
Clay, brown	4	108
Clay, green; sand, white and gray; shale	7	115
Sand, fine, black, and clay	51	166
Aquia greensand:		
Sand, coarse, black, and clay	19	185
Sand, hard, green and white, and clay	16	201
Hard pan	1	202
QA-Cf 48 (Altitude: 70 feet)		
Wicomico formation:		
Sand, yellow, and clay	23	23
Calvert formation:		
Sand, coarse, yellow	37	60
Clay, black	25	85
Shells	10	95
Clay, blue	85	180
Aquia greensand:		
Sand, hard, gray	50	230
QA-Cf 59 (Altitude: 67 feet)		
Wicomico formation:		
Sand, fine; gravel; clay	23	23
Sand, gray and white, coarse; gravel	18	41
Sand, gray and white, medium; gravel	7	48
Sand, yellow, medium	2	50
Clay, black (four inches)	—	50
Sand, gray, medium; a little clay	5	55
QA-Cf 61 (Altitude: 67 feet)		
Wicomico formation:		
Topsoil	8	8
Sand, light brown, medium to coarse; a little gravel; silt	47	55
Calvert (?) formation:		
Clay, peaty, gray; compact shells	4	59

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Cf 62 (Altitude: 67 feet)		
Wicomico formation:		
Top soil, chocolate-brown	1	1
Sand, silty, medium, light brown	1	2
Sand, silt, and clay, medium, buff to orange red	2	4
Sand and silt, buff	1	5
Silt; very fine sand; clay, hard, orange red	1	6
Sand, medium, buff and gray, clean	.5	6.5
Sand, medium to coarse, little silt, buff and light tan	.5	7
Sand, medium and coarse; a little gravel, tan-buff	5	12
QA-Cg 1 (Altitude: 67 feet)		
Wicomico and Calvert formations:		
Sand, yellow, and clay	50	50
Sand, coarse, yellow	10	60
Sand, gray	Below 60	
QA-Db 2 (Altitude: 10 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	5	10
Sand, light	10	20
Clay, gray	10	30
Sand and gravel	15	45
Eocene series (undifferentiated):		
Clay, gray	55	100
Clay, gray, and sand, black	89	189
Aquia greensand:		
(Water)	36	225
QA-Db 3 (Altitude: 6 feet)		
Talbot formation:		
Clay	5	5
Clay, yellow	10	15
Sand	5	20
Clay, yellow	15	35
Gravel and sand	5	40
Eocene series (undifferentiated):		
Clay, green	60	100
Clay, green, and sand	30	130
Aquia greensand:		
(Water)	30	160
QA-Db 5 (Altitude: 16 feet)		
Talbot formation:		
Sand	5	5
Sand and clay	5	10

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Clay, gray	10	20
Sand and clay(?)	10	30
Sand and gravel	10	40
Eocene series (undifferentiated):		
Sand, black, and clay, yellow	80	120
Aquia greensand:		
False water rock	15	135
(Water)	35	170
QA-Db 7 (Altitude: 5 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	10	15
Clay	15	30
Sand and gravel	15	45
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	75	120
Aquia greensand:		
Sand, black, and clay	80	200
Sand	20	220
(Water)	40	260
QA-Db 8 (Altitude: 18 feet)		
Talbot formation:		
Clay brown	5	5
Sand	5	10
Clay	10	20
Sand and gravel	15	35
Eocene series (undifferentiated):		
Clay, yellow	45	80
Clay green	20	100
Sand and clay, white	45	145
Aquia greensand:		
(Water)	30	175
QA-Db 9 (Altitude: 12 feet)		
Talbot (?) formation:		
Clay, light red	10	10
Sandy clay, yellow-red	12	22
Sand, red to black; gravel; iron ore	78	100
Eocene series (undifferentiated):		
Clay, arenaceous (gunpowder)	100	200
Clay, arenaceous (gunpowder) (water, pumped 10 gpm)	6	206
Monmouth formation:		
Clay, arenaceous (gunpowder), dark, fine	78	284
Matawan and Magothy formations:		
Clay, dark, micaceous	66	350

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Magothy formation(?):		
Sand, white, coarse (water)	10	360
Sand, reddish, fine (water, yield 40 gpm, irony)	22	382
(Description missing)	18	400
QA-Dd 1 (Altitude: 50 feet)		
Wicomico and Calvert formations:		
Sand, yellow, and clay	46	46
Calvert formation:		
Clay, blue-black	44	90
Calvert formation and Eocene series (undifferentiated):		
Clay, blue	70	160
Sand, gray	50	210
Aquia greensand:		
Sand, hard, gray	25	235
QA-Dd 2 (Altitude: 45 feet)		
Wicomico formation:		
Soil	4	4
Gravel	14	18
Calvert formation and Eocene series (undifferentiated):		
Clay, blue-gray	69	87
Sand, gray, and shells	83	170
Aquia greensand:		
Sand, hard, gray (water)	31	201
QA-Dd 3 (Altitude: 72 feet)		
Wicomico formation:		
Sand, yellow, and gravel	36	36
Calvert formation and Eocene series (undifferentiated):		
Sand, gray, and clay, gray	72	108
Eocene series (undifferentiated) and Aquia greensand:		
Sand rock, gray	152	260
QA-Dd 6 (Altitude: 45 feet)		
Wicomico formation:		
Sand, yellow, and clay	42	42
Calvert formation and Eocene series (undifferentiated):		
Clay, blue, and sand, black	153	195
Eocene series (undifferentiated) and Aquia greensand:		
Gravel, fine and coarse (water)	20	215
QA-Dd 7 (Altitude: 40 feet)		
Wicomico formation:		
Clay and sand	20	20
Sand	20	40
Sand and gravel	20	60

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Calvert formation and Eocene series (undifferentiated):		
Clay, gray, and sand, black	140	200
Eocene series (undifferentiated):		
Sand, vari-colored	20	220
Aquia greensand:		
Marl, white (water)	30	250
QA-Dd 8 (Altitude: 58 feet)		
Wicomico formation:		
Sand and gravel	31	31
Calvert formation:		
Clay, blue and black	39	70
Sand, water	30	100
Calvert formation and Eocene series (undifferentiated):		
Clay, soft, blue	60	160
Clay, firm, blue	20	180
Eocene series (undifferentiated) and Aquia greensand:		
Sand, rocky, hard to soft, gray and white (water)	108	288
QA-Dd 9 (Altitude: 50 feet)		
Wicomico formation:		
Clay	5	5
Sand	10	15
Clay	20	35
Gravel and sand	5	40
Gravel	5	45
Calvert formation and Eocene series (undifferentiated):		
Clay	185	230
Aquia greensand:		
Clay and sand (water)	22	252
QA-Dd 10 (Altitude: 10 feet)		
Talbot formation:		
Clay	10	10
Sand	10	20
Eocene series (undifferentiated):		
Clay, gray	72	92
Aquia greensand:		
Sandstone, hard	21	113
Sand, hard, free in places	82	195
Sand, loose	38	233
Monmouth formation:		
Sand, crusts, free in places	3	236
Monmouth and Matawan formations:		
Sandstone, hard	110	346
Crusty	14	360
Sand, free	10	370

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Sand, crusty and free in places	45	415
Sand, green, clay	5	420
QA-Dd 15 (Altitude: 71 feet)		
Wicomico formation:		
Sand and clay	20	20
Sand and gravel	20	40
Gravel (water)	20	60
Calvert formation and Eocene series (undifferentiated):		
Clay, gray, and sand, black	180	240
Aquia greensand:		
Marl, white	30	270
QA-Dd 16 (Altitude: 45 feet)		
Wicomico formation:		
Sand and clay	20	20
Sand and gravel	20	40
Calvert formation:		
Sand, vari-colored	20	60
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	160	220
Aquia greensand:		
Marl, white (water)	20	240
QA-Dd 17 (Altitude: 15 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel	20	40
Miocene and Eocene series (undifferentiated):		
Clay, gray	80	120
Aquia greensand:		
Marl, white	20	140
QA-De 1 (Altitude: 60 feet)		
Wicomico formation:		
Topsoil, sand and clay	20	20
Calvert formation:		
Sand, white and blue	10	30
Clay, brown	10	40
Lime; sand, white; shale; clay, dove gray	10	50
Clay, dark gray; some shale	92	142
Eocene series (undifferentiated):		
Sand, black and white, and clay, light gray	43	185
Sand, black and white	64	249
Aquia greensand:		
Sand, black, green and white, and clay, green	24	273
Sand, black, green and white (water)	21	294

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-De 2 (Altitude: 64 feet)		
Wicomico formation:		
Sand, yellow, and gravel	35	35
Calvert formation:		
Clay, soft, blue-black	40	75
Sand, fine blue, clay, and shells	30	105
Eocene series (undifferentiated):		
Shells, hard, and sand	55	160
QA-De 3 (Altitude: 59 feet)		
Wicomico formation:		
Soil	7	7
Gravel, large	28	35
Calvert formation:		
Clay, soft, blue	40	75
Shells and sand	15	90
Clay, dark	52	142
Eocene series (undifferentiated) and Aquia greensand:		
Sand, hard, gray	109	251
QA-De 4 (Altitude: 50 feet)		
Wicomico formation:		
Soil and sand	10	10
Calvert formation:		
Clay and sand	65	75
Calvert formation and Eocene series (undifferentiated):		
Sand (water, irony)	15	90
Clay and sand	50	140
Clay	25	165
Eocene series (undifferentiated) and Aquia greensand:		
Sandstone, hard cemented (water)	37	202
QA-De 24 (Altitude: 42 feet)		
Wicomico formation:		
Sand	20	20
Sand and gravel	20	40
Calvert formation:		
Clay	23	63
Eocene series (undifferentiated):		
Sand and clay	126	189
Aquia greensand:		
(Water)	21	210
QA-De 27 (Altitude: 15 feet)		
Recent(?) deposits:		
Marsh	18	18

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Calvert formation:		
Clay, green	132	150
Aquia greensand:		
Sand, black	20	170
Sand, soft	24	194
Rock, hard	20	214
(10″ casing at 108 ft. pumped 100 gpm)		
Rock, somewhat soft	56	270
Sand, free, light	6	276
Rock, hard, then softer	49	325
(drilled to soft sand mixed with shells, drove 10″ pipe to 361 ft., pumped 150 gpm)		
Monmouth formation:		
Hard and soft	5	355
Sand and shells	11	366
Somewhat hard (water, yield 250 gpm)	25	391
Sand	39	430
Matawan formation:		
Sandy clay, brown	60	490
Clay, brown	40	530
QA-De 28 (Altitude: 15 feet)		
Talbot formation:		
Made ground	8	8
Marsh mud	17	25
Calvert formation:		
Clay, green	81	106
Eocene series (undifferentiated):		
"Shells"	64	170
Aquia greensand:		
Sand; olive-yellow, coarse, greensand; white quartz grains	60	230
Greensand, few quartz grains	10	240
Sand, olive	40	280
Aquia greensand and Monmouth formation:		
Sand, dark olive	76	356
Monmouth formation:		
Sand, gray	4	360
Sand, olive, lime cement	5	365
Shell layer	5	370
Greensand and yellow quartz; shells (water at 428 ft.)	60	430
Quartz, green, yellow	30	460
Matawan formation:		
Clay; greensand, olive	20	480
QA-Df 1 (Altitude: 60 feet)		
Wicomico formation:		
Clay, yellow and white	4	4
Sand, fine, yellow	21	25

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Calvert formation:		
Sand, coarse, yellow and white	18	43
Clay, green	67	110
Eocene series (undifferentiated):		
Clay, green, and sand, black	138	248
Sand, green, and clay	22	270
Aquia greensand:		
Sand, hard, green	15	285
QA-Ea 5 (Altitude: 16 feet)		
Talbot formation:		
Clay	44	44
Gravel	3	47
Eocene series (undifferentiated):		
Clay, sandy	32	79
Sandy	11	90
Clay	45	135
Aquia greensand:		
Hard	7	142
Clay, sandy	40	182
Clay	17	199
Hard, very	3	202
Hard	13	215
Clay, sandy	21	236
Hard	1	237
Monmouth formation:		
Clay, sandy	36	273
Clay	72	345
Matawan formation:		
Clay, soft, black; a little red sand	35	380
Magothy formation:		
Clay, black	63	443
Clay, sand, crust	8	451
Raritan formation:		
Clay, sandy	14	465
Crust	1	466
Clay, sandy	4	470
Clay	3	473
Hard	2	475
Clay, sandy	5	480
Clay	2	482
Clay, sandy	130	612
Hard	13	625
Sand (water, irony and acid)	14	639

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Ea 6 (Altitude: 18 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel	20	40
Eocene series (undifferentiated):		
Clay and sand	60	100
Sand and gravel	20	120
Aquia greensand:		
Marl, white (water)	20	140
QA-Ea 8 (Altitude: 8 feet)		
Talbot formation:		
Sand and clay (water)	20	20
Sand and gravel (water)	20	40
Sand, red (water)	20	60
Calvert formation and Eocene series (undifferentiated):		
Clay, blue	150	210
Aquia greensand:		
Marl, white	22	232
QA-Ea 9 (Altitude: 9 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel	20	40
Eocene series (undifferentiated):		
Clay, gray	80	120
Clay, green	20	140
Aquia greensand:		
Marl, white (water)	15	155
QA-Ea 11 (Altitude: 20 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel	20	40
Eocene series (undifferentiated):		
Clay, gray, and sand, black	80	120
Aquia greensand:		
Marl, white (water)	20	140
QA-Ea 13 (Altitude: 9 feet)		
Talbnt formation:		
Clay, brown	5	5
Sand	5	10
Sand and clay	10	20
Sand	10	30
Sand and gravel	10	40

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Eocene series (undifferentiated):		
Sand, black, and clay, gray	80	120
Sand, coarse	5	125
Aquia greensand:		
(Water)	35	160
QA-Ea 14 (Altitude: 15 feet)		
Talbot formation:		
Clay and sand (water)	20	20
Sand and gravel (water)	20	40
Eocene series (undifferentiated):		
Sand, red (water)	20	60
Clay, gray	60	120
Clay and sand	40	160
Sand and gravel (water)	20	180
Aquia greensand:		
Marl, white (water)	20	200
QA-Ea 15 (Altitude: 12 feet)		
Talbot formation:		
Clay brown	5	5
Sand	10	15
Clay, green	15	30
Sand and gravel	15	45
Eocene series (undifferentiated):		
Sand, black, and clay, gray	85	130
Sand	10	140
Aquia greensand:		
(Water)	40	180
QA-Ea 18 (Altitude: 14 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	10	15
Clay, green	15	30
Sand and gravel	15	45
Eocene series (undifferentiated):		
Sand, black, and clay, gray	85	130
Clay, green, and sand	17	147
Aquia greensand:		
(Water)	33	180
QA-Ea 20 (Altitude: 10 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel	20	40
Rock	.5	40.5

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Eocene series (undifferentiated):		
Clay and sand	19.5	60
Clay	20	80
Clay, gray; some sand	20	100
Clay	40	140
Sand, vari-colored	20	160
Aquia greensand:		
Marl, white (water)	20	180
QA-Eb 1 (Altitude: 10 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel (water)	30	50
Eocene series (undifferentiated):		
Clay and sand	50	100
Sand, black and white	40	140
Sand; some gravel (water)	20	160
Sand and gravel (water)	20	180
Gravel; some sand (water)	20	200
Aquia greensand:		
(Hit rock at 200′, very hard, did not drill through, pumped sand 6 hours)		
QA-Eb 2 (Altitude: 18 feet)		
Talbot formation:		
Clay, brown	10	10
Sand, light	10	20
Clay, gray	20	40
Gravel and sand, white	5	45
Eocene series (undifferentiated):		
Clay, gray, and sand	95	140
Sand, white	49	189
Aquia greensand:		
(Water)	44	233
QA-Eb 4 (Altitude: 7 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	10	15
Clay	10	25
Sand, white	10	35
Sand and gravel	10	45
Eocene series (undifferentiated):		
Clay, gray	55	100
Sand, black, and clay	40	140
Clay	40	180
Gravel	9	189

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
(Water)	41	230
QA-Eb 5 (Altitude: 6 feet)		
Talbot formation:		
Topsoil and sand	20	20
Sand, red	20	40
Gravel and sand	20	60
QA-Eb 6 (Altitude: 15 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel	40	60
Eocene series (undifferentiated):		
Clay, gray	120	180
Sand and clay, green	10	190
Aquia greensand:		
Marl, white	20	210
QA-Eb 7 (Altitude: 15 feet)		
Talbot formation:		
Sand and clay	40	40
Eocene series (undifferentiated):		
Clay, gray	110	150
Clay, green, and sand	10	160
Sand and some gravel	20	180
Sand, varicolored	20	200
Aquia greensand:		
Marl, white	25	225
QA-Eb 8 (Altitude: 15 feet)		
Talbot formation:		
Clay and sand	20	20
Clay and gravel (water)	20	40
Eocene series (undifferentiated):		
Clay, gray, and sand, black	140	180
Aquia greensand:		
Marl, white, and sand (water)	30	210
QA-Eb 18 (Altitude: 10 feet)		
Talbot formation:		
Clay, brown	5	5
Sand, yellow, and clay	15	20
Sand, light	10	30
Gravel and clay, gray	10	40

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Eocene series (undifferentiated):		
Clay, gray	130	170
Sand, light, gravel, and rock	35	205
Aquia greensand:		
(Water)	36	241
QA-Eb 23 (Altitude: 17 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel	20	40
Sand and gravel (water)	20	60
Eocene series (undifferentiated):		
Sand, black, and clay	120	180
Sand, and clay, green	10	190
Aquia greensand:		
Marl, white (water)	20	210
QA-Eb 25 (Altitude: 17 feet)		
Talbot formation:		
Clay, yellow	12	12
Sand, reddish	7	19
Clay, gray	26	45
Gravel	3	48
Eocene series (undifferentiated):		
Clay, gray; some sand, black	92	140
Sand, black, and clay, greenish; some sand, white	40	180
Sand, black and white	18	198
Aquia greensand:		
Sand and gravel; mostly gravel (water)	26	224
QA-Eb 34 (Altitude: 18 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel	20	40
Eocene series (undifferentiated):		
Sand and clay	23	63
Clay, gray	97	160
Sand, coarse (water)	20	180
Aquia greensand:		
Marl, white; sand, coarse (water)	30	210
QA-Eb 35 (Altitude: 10 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel	20	40

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Eocene series (undifferentiated):		
Clay, gray	140	180
Sand, little gravel	10	190
Aquia greensand:		
Marl, white, and sand (water)	25	215
QA-Eb 38 (Altitude: 10 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel	40	60
Eocene series (undifferentiated):		
Clay, gray	120	180
Sand and clay, green	10	190
Aquia greensand:		
Marl, white	20	210
QA-Eb 40 (Altitude: 17 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	5	10
Clay	10	20
Sand	10	30
Sand and gravel	15	45
Eocene series (undifferentiated):		
Clay, gray	123	168
Sand, light	21	189
Aquia greensand:		
(Water)	11	200
QA-Eb 42 (Altitude: 10 feet)		
Talbot formation:		
Clay, brown	5	5
Clay, yellow	5	10
Sand, light	10	20
Clay, gray	10	30
Sand, light	10	40
Gravel and sand	5	45
Eocene series (undifferentiated):		
Clay, gray	120	165
Sand and clay	15	180
Aquia greensand:		
(Water)	30	210
QA-Eb 45 (Altitude: 10 feet)		
Talbot formation:		
Sand, yellow	5	5
Sand	10	15

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Clay, gray	10	25
Clay, green	5	30
Eocene series (undifferentiated):		
Clay	70	100
Clay and sand, black	75	175
Aquia greensand:		
(Water)	35	210
QA-Eb 48 (Altitude: 9 feet)		
Talbot formation:		
Clay, brown	10	10
Sand, yellow	5	15
Clay	5	20
Sand and clay	10	30
Sand and gravel	15	45
Eocene series (undifferentiated):		
Clay, gray	105	150
Sand, light	28	178
Aquia greensand:		
(Water)	37	215
QA-Eb 53 (Altitude: 16 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	10	15
Clay, gray	15	30
Sand and gravel	10	40
Eocene series (undifferentiated):		
Clay, gray	85	125
Clay and shells	20	145
Sand, black, and clay, gray	35	180
Sand, coarse	9	189
Aquia greensand:		
(Water)	31	220
QA-Eb 62 (Altitude: 15 feet)		
Talbot formation:		
Topsoil and clay	10	10
Clay	10	20
Sand	10	30
Eocene series (undifferentiated):		
Clay	140	170
Sand and gravel	20	190
Aquia greensand:		
Gravel (water)	10	200

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Eb 69 (Altitude: 9 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel	20	40
Sand, some gravel	20	60
Eocene series (undifferentiated):		
Sand, black, and clay	80	140
Clay, greenish, and sand	20	160
Clay and sand	20	180
Sand, black	20	200
Sand, black; mixed with clay, green	20	220
Sand, black	20	240
Sand, black, some clay	10	250
Aquia greensand:		
Marl, white	10	260
QA-Eb 70 (Altitude: 9 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel (water)	20	40
Eocene series (undifferentiated):		
Clay, gray	120	160
Clay and sand	20	180
Sand and gravel (water)	20	200
Sand	10	210
Aquia greensand:		
Marl, white (water)	15	225
QA-Eb 71 (Altitude: 9 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel (water)	60	80
Eocene series (undifferentiated):		
Sand, black, and clay	120	200
Sand, some gravel	25	225
Aquia greensand:		
Marl, white, very hard (water)	25	250
QA-Eb 72 (Altitude: 9 feet)		
Talbot formation:		
Sand, yellow	5	5
Sand, light	5	10
Clay	10	20
Sand	10	30
Clay and sand	10	40
Clay	10	50
Sand	10	60
Sand and gravel	30	90

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Eocene series (undifferentiated):		
Clay	120	210
Sand, yellow	15	225
Aquia greensand:		
(Water)	40	265
QA-Eb 76 (Altitude: 13 feet)		
Talbot formation:		
Clay	5	5
Sand	5	10
Sand and clay	10	20
Sand, light	10	30
Sand and gravel	10	40
Eocene series (undifferentiated):		
Clay, gray, and shells	65	105
Clay, gray	105	210
Aquia greensand:		
(Water)	30	240
QA-Eb 77 (Altitude: 12 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel	20	40
Eocene series (undifferentiated):		
Clay, gray	80	120
Clay, gray, and sand, black	40	160
Sand and gravel	20	180
Sand; some gravel	20	200
Aquia greensand:		
Rocky formation (water)	10	210
QA-Eb 79 (Altitude: 14 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel	20	40
Eocene series (undifferentiated):		
Clay, gray	80	120
Clay and sand	60	180
Aquia greensand:		
Hard rock, gravel (hard drilling)	5	185
Sand and clay, green	25	210
Marl, white	25	235
QA-Eb 81 (Altitude: 11 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel	50	70

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Eocene series (undifferentiated):		
Clay, gray	110	180
Clay and sand	52	232
Aquia greensand:		
Marl, white	20	252
QA-Eb 85 (Altitude: 10 feet)		
Talbot formation:		
Clay, brown	10	10
Sand	10	20
Clay, gray	20	40
Sand, light	20	60
Clay	20	80
Sand and gravel	25	105
Eocene series (undifferentiated):		
Clay, gray, and sand, black	95	200
Sand and clay, green	33	233
Aquia greensand:		
(Water)	47	280
QA-Eb 88 (Altitude: 10 feet)		
Talbot formation:		
Clay	10	10
Sand	20	30
Clay	10	40
Clay, gray	70	110
Sand and gravel	5	115
Eocene series (undifferentiated):		
Sand, black, and clay, gray	85	200
Sand	45	245
Aquia greensand:		
(Water)	38	283
QA-Eb 91 (Altitude: 9 feet)		
Talbot formation:		
Clay	10	10
Sand	20	30
Clay	10	40
Clay, gray	70	110
Sand and gravel	5	115
Sand and clay, gray	85	200
Aquia greensand:		
Sand	45	245
(Water)	35	280

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Eb 97 (Altitude: 9 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel	60	80
Eocene series (undifferentiated):		
Clay, gray	90	170
Sand and gravel, (water)	20	190
Sand and clay	30	220
Aquia greensand:		
Marl, white (water)	25	245
QA-Eb 101 (Altitude: 9 feet)		
Talbot formation:		
Clay, brown	5	5
Clay and sand	10	15
Sand, white	10	25
Clay	5	30
Sand and gravel	10	40
Eocene series (undifferentiated):		
Sand, white	40	80
Clay	20	100
Sand, black, and clay	110	210
Aquia greensand:		
Sand	12	222
(Water)	33	255
QA-Eb 105 (Altitude: 7 feet)		
Talbot formation:		
Clay, brown	5	5
Sand, yellow	5	10
Sand, light	5	15
Clay, gray	10	25
Sand, light, and clay, gray	20	45
Eocene series (undifferentiated):		
Clay, gray	95	140
Quicksand	30	170
Gravel and sand	10	180
Aquia greensand:		
(Water)	35	215
QA-Eb 108 (Altitude: 10 feet)		
Talbot formation:		
Sand and clay	20	20
Sand, fine, and gravel	20	40
Eocene series (undifferentiated):		
Clay, gray	100	140
Sand, gray and white	20	160

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
Varicolored sand, a little gravel	20	180
Marl, white; greensand; green clay	25	205
QA-Ec 3 (Altitude: 18 feet)		
Talbot formation:		
Sand	5	5
Sand and clay	5	10
Sand, white	10	20
Clay, gray	10	30
Sand and clay, gray	10	40
Sand, light	10	50
Sand and gravel	15	65
Calvert formation and Eocene series (undifferentiated(:		
Sand, black, and clay	135	200
Sand, coarse	15	215
Aquia greensand:		
(Water)	25	240
QA-Ec 7 (Altitude: 6 feet)		
Talbot formation:		
Clay and sand	21	21
Sand and gravel	21	42
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	84	126
Sand and clay	21	147
Sand, black, and clay	63	210
Aquia greensand:		
Clay, green, and sand, black	20	230
Marl, white, and gravel (water)	115	245
QA-Ec 9 (Altitude: 6 feet)		
Talbot formation:		
Sand	5	5
Sand and clay	5	10
Sand, white	10	20
Clay, gray	10	30
Sand and clay, gray	10	40
Sand, light	10	50
Sand and gravel	15	65
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay	120	185
Sand, coarse	7	192
Aquia greensand:		
(Water)	38	230

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Ec 20 (Altitude: 2 feet)		
Talbot formation:		
Clay, brown	5	5
Clay and sand	10	15
Clay	5	20
Clay, gray	50	70
Gravel and sand	15	85
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	85	170
Clay, gray	55	225
Aquia greensand:		
(Water)	35	260
QA-Ec 21 (Altitude: 12 feet)		
Talbot formation:		
Clay, brown	5	5
Sand, light	10	15
Clay	10	25
Sand and gravel	40	65
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	125	190
Clay and sand	20	210
Aquia greensand:		
(Water)	35	245
QA-Ec 23 (Altitude: 7 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel	20	40
Calvert formation and Eocene series (undifferentiated):		
Clay, gray, and sand, black	120	160
Sand, black; some gravel	20	180
Aquia greensand:		
Sand, varicolored	20	200
White coral	25	225
QA-Ec 27 (Altitude: 7 feet)		
Talbot formation:		
Sand, light	10	10
Sand and gravel	15	25
Clay	20	45
Sand	20	65
Calvert formation and Eocene series (undifferentiated):		
Clay	35	100
Clay and sand, black	70	170
Sand	19	189
Aquia greensand:		
(Water)	36	225

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Ec 34 (Altitude: 2 feet)		
Talbot Formation:		
Sand	5	5
Clay	5	10
Sand, light	10	20
Clay, gray	35	55
Sand and gravel	10	65
Calvert formation and Eocene series (undifferentiated):		
Clay, gray, and sand, black	135	200
Sand	10	210
Aquia greensand:		
(Water)	45	255
QA-Ec 39 (Altitude: 4 feet)		
Talbot formation:		
Sand and gravel	20	20
Sand, clay, and gravel	20	40
Calvert formation and Eocene series (undifferentiated):		
Sand, white	20	60
Clay and sand	95	155
Sand (hard pan) (water)	5	160
Sand and clay, green	20	180
Aquia greensand:		
Marl, white (water)	20	200
QA-Ec 41 (Altitude: 2 feet)		
Talbot formation:		
Clay and sand	20	20
Sand	60	80
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	80	160
Clay, green, and sand	20	180
Aquia greensand:		
White coral (water)	25	205
QA-Ec 42 (Altitude: 16 feet)		
Talbot formation:		
Clay and sand	20	20
Sand	20	40
Sand and gravel	20	60
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	100	160
Clay, gray, and sand, black	100	260
Aquia greensand:		
Clay, greenish, and sand	25	285
White coral	30	315

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Ec 43 (Altitude: 3 feet)		
Talbot formation:		
Clay, brown	5	5
Marsh, mud	5	10
Clay	10	20
Clay and sand	10	30
Sand	10	40
Clay, gray	10	50
Sand and gravel	15	65
Calvert formation and Eocene series (undifferentiated):		
Clay, gray, and sand, black	105	170
Sand, coarse, and clay, gray	19	189
Aquia greensand:		
(Water)	31	220
QA-Ec 48 (Altitude: 20 feet)		
Talbot formation:		
Clay, brown	5	5
Sand, yellow	5	10
Clay	15	25
Sand, light	5	30
Clay and sand	10	40
Sand and shells	40	80
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	51	131
Clay, gray	100	231
Aquia greensand:		
(Water)	34	265
QA-Ec 50 (Altitude: 27 feet)		
Talbot formation:		
Sand, yellow	5	5
Sand, light	15	20
Clay	30	50
Sand, light, and shells	20	70
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	130	200
Aquia greensand:		
Sand, coarse	45	245
(Water)	35	280
QA-Ec 53 (Altitude: 10 feet)		
Talbot formation:		
Loam, sandy, yellow	30	30
Gravel, fine	1.5	31.5
Calvert formation and Eocene series (undifferentiated):		
Sand, black; mixed with clay, blue	158.5	190

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
Rock, porous, light gray (water)	20	210
QA-Ec 55 (Altitude: 5 feet)		
Talbot formation:		
Clay and gravel (water)	20	20
Sand and gravel (water)	20	40
Calvert formation and Eocene series (undifferentiated):		
Clay, gray, and sand, black	140	180
Sand, coarse (water)	10	190
Aquia greensand:		
Marl, white (water)	20	210
QA-Ec 57 (Altitude: 19 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	5	10
Clay	10	20
Sand, white	10	30
Gravel and sand	10	40
Clay	10	50
Gravel and sand	15	65
Calvert formation and Eocene series (undifferentiated):		
Clay, gray, and sand, black	189	254
Aquia greensand:		
(Water)	40	294
QA-Ec 61 (Altitude: 19 feet)		
Talbot formation:		
Clay and gravel	20	20
Sand and gravel	20	40
Gravel; mostly sand	20	60
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	160	220
Sand, some gravel	15	235
Aquia greensand:		
Marl, white	17	252
QA-Ec 68 (Altitude: 18 feet)		
Talbot formation:		
Sand, yellow	5	5
Sand, light	15	20
Clay	20	40
Calvert formation and Eocene series (undifferentiated):		
Sand and clay	40	80
Sand and shells	45	125

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Clay, gray	65	190
Sand, coarse	15	205
Aquia greensand:		
(Water)	30	235
QA-Ec 69 (Altitude: 18 feet)		
Talbot formation:		
Clay, yellow	5	5
Sand	5	10
Sand and clay	10	20
Sand, light	10	30
Sand and gravel	10	40
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	175	215
Aquia greensand:		
(Water)	40	255
QA-Ec 77 (Altitude: 9 feet)		
Talbot formation:		
Sand	5	5
Sand and gravel	20	25
Clay	20	45
Shells and sand	20	65
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	115	180
Sand	9	189
Aquia greensand:		
(Water)	41	230
QA-Ec 80 (Altitude: 19 feet)		
Talbot formation:		
Sand	5	5
Sand and clay	5	10
Sand, white	10	20
Clay, gray	10	30
Sand and clay, gray	10	40
Sand, light	10	50
Sand and gravel	15	65
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay	135	200
Sand, coarse	15	215
Aquia greensand:		
(Water)	30	245
QA-Ec 81 (Altitude: 18 feet)		
Talbot formation:		
Clay	5	5
Sand	10	15

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Clay, gray	30	45
Sand and shells	20	65
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	125	190
Sand	20	210
Aquia greensand:		
(Water)	35	245
QA-Ed 1 (Altitude: 12 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel	60	80
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, blue	180	260
Aquia greensand:		
Marl, white	25	285
QA-Ed 2 (Altitude: 16 feet)		
Talbot formation:		
Sand, yellow	5	5
Sand, light	15	20
Calvert formation and Eocene series (undifferentiated):		
Clay	20	40
Sand and clay	40	80
Sand and shells	45	125
Eocene series (undifferentiated):		
Clay, gray	65	190
Sand, coarse	15	205
Aquia greensand:		
(Water)	30	235
QA-Ed 3 (Altitude: 14 feet)		
Talbot formation:		
Sand and clay	60	60
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, blue	120	180
Clay, green, and sand	20	200
Sand, hard, and clay	10	210
Aquia greensand:		
Marl, white	20	230
QA-Ed 4 (Altitude: 63 feet)		
Wicomico formation:		
Clay	8	8
Sand	13	21
Sand, yellow	21	42

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Calvert formation and Eocene series (undifferentiated):		
Sand and shells	63	105
Clay, blue	75	180
Eocene series (undifferentiated):		
Sand, black	93	273
Sand and clay	87	360
Aquia greensand:		
Sand, brown	31	391
(Description missing)	3	394
QA-Ed 5 (Altitude: 59 feet)		
Wicomico formation:		
Sand, clay	24	24
Gravel	6	30
Calvert formation and Eocene series (undifferentiated):		
Clay, light	60	90
Clay, blue	98	188
Eocene series (undifferentiated) and Aquia greensand:		
Sand, gray (water)	97	285
QA-Ed 7 (Altitude: 18 feet):		
Talbot formation:		
Clay and sand	21	21
Sand and gravel	21	42
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	105	147
Clay and sand	21	168
Clay, sand, and gravel	21	189
Clay and sand	21	210
Aquia greensand:		
Marl, white, and gravel	31	241
QA-Ed 8 (Altitude: 35 feet)		
Wicomico formation:		
Sand	5	5
Clay and sand	10	15
Sand	10	25
Sand and gravel	15	40
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	50	90
Clay, gray, and sand, black	130	220
Eocene series (undifferentiated):		
Sand, coarse, and clay, green	20	240
Aquia greensand:		
(Water)	40	280

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Ed 15 (Altitude: 58 feet)		
Wicomico formation:		
Clay, brown	5	5
Sand	20	25
Sand and gravel	5	30
Sand and clay	10	40
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	60	100
Sand, black, and clay, gray	100	200
Sand	50	250
Aquia greensand:		
(Water)	35	285
QA-Ed 33 (Altitude: 62 feet)		
Wicomico formation:		
Clay, brown	10	10
Sand	15	25
Clay	10	35
Sand and gravel	10	45
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	195	240
Sand	15	265
Aquia greensand:		
(Water)	40	295
QA-Ed 36 (Altitude: 15 feet)		
Talbot formation:		
Clay	10	10
Sand	6	16
Calvert formation:		
Clay	52	68
Calvert formation and Eocene series (undifferentiated):		
Clay, sandy	12	80
Clay	84	164
Sand	22	186
Aquia greensand:		
"Rock" (marl ?)	80	266
Sand	54	320
QA-Ee 1 (Altitude: 76 feet)		
Wicomico formation:		
Loam, sandy	30	30
Calvert formation:		
Sand, gray	50	80
Eocene series (undifferentiated):		
Sand, fine black	40	120
Sand, coarse, black and brown	20	140

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Fa 1 (Altitude: 8 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	10	15
Clay	5	20
Clay, gray	5	25
Sand	10	35
Sand and gravel	10	45
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay	144	189
Gravel	26	215
Aquia greensand:		
Clay, green	20	235
Sand, coarse	8	243
(Water)	42	285
QA-Fa 6 (Altitude: 8 feet)		
Talbot formation:		
Sand, yellow	5	5
Sand, light	5	10
Clay	10	20
Sand, white	10	30
Sand and gravel	13	43
Calvert formation and Eocene series (undifferentiated):		
Clay	57	100
Clay and sand	75	175
Aquia greensand:		
Sand and clay, green	15	190
(Water)	40	230
QA-Fa 16 (Altitude: 8 feet)		
Talbot formation:		
Clay	5	5
Sand	5	10
Clay	10	20
Sand and clay	10	30
Sand and gravel	10	40
Calvert formation and Eocene series (undifferentiated):		
Clay	60	100
Sand, black, and clay	80	180
Rock and gravel	10	190
Aquia greensand:		
(Water)	45	235
QA-Fa 17 (Altitude: 10 feet)		
Talbot formation:		
Clay	5	5
Sand	10	15

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Clay	5	20
Clay and sand	30	50
Gravel and sand	10	60
Calvert formation and Eocene series (undifferentiated):		
Clay	130	190
Aquia greensand:		
Gravel (water)	10	200
QA-Fa 18 (Altitude: 13 feet)		
Talbot formation:		
Sand and clay	20	20
Sand and gravel	53	73
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	127	200
Sand and clay	70	270
Aquia greensand:		
Rocky formation	23	293
QA-Fa 20 (Altitude: 6 feet)		
Talbot formation:		
Clay, brown	5	5
Sand, brown	10	15
Sand, light	10	25
Clay	5	30
Sand and gravel	10	40
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	89	129
Sand, black, and clay, gray	111	240
Aquia greensand:		
(Water)	40	280
QA-Fa 32 (Altitude: 12 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	5	10
Clay	10	20
Sand, light	10	30
Sand and clay	20	50
Sand and gravel	15	65
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, gray	175	240
Aquia greensand:		
(Water)	45	285
QA-Fa 33 (Altitude: 6 feet)		
Talbot formation:		
Clay, brown	10	10
Sand	10	20

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Clay	10	30
Sand and gravel	15	45
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	125	170
Gravel and sand	30	200
Sand, black	25	225
Aquia greensand:		
(Water)	50	275
QA-Fa 37 (Altitude: 6 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	10	15
Clay	5	20
Clay, gray	5	25
Sand	10	35
Sand and gravel	10	45
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay	144	189
Gravel	26	215
Aquia greensand:		
Clay, green	20	235
Sand, coarse	8	243
(Water)	42	285
QA-Fa 38 (Altitude: 6 feet)		
Talbot formation:		
Clay, brown	5	5
Sand, yellow	5	5
Sand and clay	10	20
Clay	10	30
Sand and gravel	10	40
Calvert formation and Eocene series (undifferentiated):		
Clay	10	50
Clay and sand, black	150	200
Aquia greensand:		
Clay, and sand, brown	27	227
(Water)	38	265
QA-Fa 39 (Altitude: 4 feet)		
Talbot formation:		
Clay and sand	20	20
Sand, some gravel	20	40
Gravel (water)	5	45
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	135	180

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Sand (water)	10	190
Sand and gravel (water)	20	210
Aquia greensand:		
Gravel (water)	5	215
QA-Fa 42 (Altitude: 4 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	5	10
Clay, white	10	20
Clay, gray	15	35
Sand and gravel	10	45
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	55	100
Clay, black and gray	120	220
Sand and gravel	15	235
Aquia greensand:		
Sand	12	247
(Water)	40	287
QA-Fa 43 (Altitude: 12 feet)		
Talbot formation:		
Clay, brown	5	5
Sand, white	10	15
Clay	5	20
Sand, yellow	10	30
Sand and gravel	10	40
Calvert formation and Eocene series (undifferentiated):		
Sand, light	15	55
Sand, black, and clay, gray	145	200
Sand	40	240
Sand, coarse	24	264
Aquia greensand:		
(Water)	30	294
QA-Fa 44 (Altitude: 10 feet)		
Talbot formation:		
Clay, brown	5	5
Sand	10	15
Sand and clay	10	25
Clay	10	35
Gravel and sand	10	45
Calvert formation and Eocene series (undifferentiated):		
Clay, gray, and sand, black	140	185
Sand	7	192
Aquia greensand:		
(Water)	43	235

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
QA-Fa 46 (Altitude: 10 feet)		
Talbot formation:		
Clay and sand	20	20
Sand and gravel (water)	20	40
Sand (water)	20	60
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	120	180
Clay, green, and sand	20	200
Clay, green	20	220
Aquia greensand:		
Marl, white (water)	20	240
QA-Fa 47 (Altitude: 8 feet)		
No record (reported first greensand at 148 feet)	148	148
Aquia greensand:		
Top of hard bed (marl at 263 feet)	115	263
Marl	9	272
Marl and sand, green, some clay, yellow-green	4	276
Similar to above, somewhat browner at 285 feet	12	288
Sand, medium, brownish green; some shell fragments	5	293
QA-Fc 1 (Altitude: 10 feet)		
Talbot formation:		
Sand, light	5	5
Sand, yellow	5	10
Sand and clay	20	30
Sand and gravel	10	40
Calvert formation and Eocene series (undifferentiated):		
Clay, gray	80	120
Sand, black, and clay, gray	130	250
Clay, black and gray	110	360
Sand, coarse, and clay, green	20	380
Aquia greensand:		
(Water)	35	415
QA-Fc 2 (Altitude: 11 feet)		
Talbot formation:		
Loam, sandy	21	21
Rock, very hard	2	23
Calvert formation and Eocene series (undifferentiated):		
Sand, black, and clay, blue	327	350
Aquia greensand:		
Coral, white (water)	20	370
QA-Fc 3 (Altitude: 11 feet)		
Talbot formation:		
Sand, yellow	30	30

TABLE 50—*Continued*

	Thickness (feet)	Depth (feet)
Calvert formation and Eocene series (undifferentiated):		
Sand, white; mixed with clay, blue	90	120
Clay, blue	240	360
Aquia greensand:		
Coral	20	380
QA-Fc 6 (Altitude: 17 feet)		
Talbot formation:		
Sand, yellow	30	30
Calvert formation and Eocene series (undifferentiated):		
Clay, blue, and some sand, white	100	130
Clay, blue	230	360
Aquia greensand:		
Coral	20	380
Tal-Af 6 (Altitude: 25 feet)		
Talbot formation:		
Sand, yellow, and clay	41	41
Calvert formation:		
Clay, blue	19	60
Shells and sand	10	70
Clay, blue	80	150
Sand	15	165
Tal-Af 7 (Altitude: 23 feet)		
Talbot formation:		
Sand, yellow, and gravel	23	23
Calvert formation:		
Clay, blue and brown; shells and sand	48	71
Clay, blue	30	101
Shell beds	9	110
Clay, blue	40	150
Shells and sand	20	170
Tal-Af 8 (Altitude: 25 feet)		
Talbot formation:		
Sand and clay	15	15
Sand and gravel	10	25
Calvert formation:		
Clay, gray	5	30
Sand and shells	16	46
Sand, brown	33	79
Sand and shells	6	85
Clay, brown	51	136
Rock	3	139
Sand, gray	26	165

Table 51

Logs of Wells in Cecil County from Which Cuttings Were Obtained

	Thickness (feet)	Depth (feet)
Ce-Be 46 (Altitude: 70 feet)		
Wicomico formation:		
Sand and gravel, weak yellowish-orange; gravel to 1 inch	20	20
Patuxent formation:		
Clay, weak orange-pink; a little medium-grained white sand; mica common	20	40
Clay, moderate reddish-orange; some sand, weak orange-pink, medium-coarse, very micaceous	10	50
Clay, moderate reddish-brown; some sand, coarse and granular, micaceous	10	60
Sand and clay, moderate reddish-orange; sand, white, coarse, very micaceous	10	70
Sand and clay; clay, white (kaolinitic) and medium reddish-orange; sand, white, coarse, and granular; coarse flakes of muscovite	20	90
Sandy clay, white and moderate reddish-orange; sand, medium-coarse, white, micaceous	20	110
Clay and sand, very pale orange; sand, white, coarse, micaceous	40	150
Sand, some clay; sand, light gray, poorly sorted, very coarse to very fine, finely micaceous; some dark iron silicates	25	175
Sand, some clay, similar to above but sand finer	10	185
Sand, very pale orange-gray, very micaceous, chiefly medium-grained, but also much fine-, coarse-, and very coarse-grained	20	205
(Sample missing) (crystalline rock?)	5	210
Ce-Cf 5 (Altitude: 45 feet)		
Wicomico formation:		
Sandy clay, weak yellowish-orange	30	30
Magothy formation:		
Clay, light brownish-gray	60	90
Raritan formation:		
Sand, moderate yellowish-orange, chiefly medium-grained, iron-stained	10	100
Clay, medium gray	20	120
Sand, moderate yellowish-orange, chiefly medium-grained	30	150
Ce-Cf 32 (Altitude: 15 feet)		
Raritan formation:		
Sand and clay, weak yellowish-orange; sand, fine- and very fine-grained	20	20
Sand and clay, weak yellowish-orange; clay, yellowish-white	20	40
Sand and clay, weak yellowish-orange; sand, fine- to very fine-grained; medium-grained muscovite flakes fairly common	20	60
Sand and clay, similar to above, but more white clay	10	70
Clay, sandy, very pale brown	20	90
Sand and clay, weak yellow-orange; sand, fine-grained	10	100
Sand, weak yellowish-orange, medium coarse-grained	8	108

TABLE 51—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Dd 47 (Altitude: 30 feet)		
Wicomico formation:		
Soil and subsoil	15	15
Clay, sand, a little gravel, weak yellowish-orange; sand, poorly sorted, granules to very fine-grained; a little muscovite	10	25
Raritan formation:		
Sand, weak yellowish-orange, poorly sorted, gravel to very fine-grained; a few muscovite flakes	31	56
Clay, variegated, weak reddish-orange and yellowish-gray; some fine sand	29	85
Sand and gravel, weak yellowish-orange; gravel, quartz, and pieces of hard iron oxide	1	86
Hard iron oxide	1	87
Sand, weak yellowish-orange, coarse medium-grained less fine and very fine	2	89
Clay, pale orange	1	90
Sand, weak yellowish-orange, medium-grained	4	94
(Samples missing)	34	128
Ce-Dd 51 (Altitude: 85 feet)		
Wicomico, Monmouth, and Matawan formations:		
No samples	116	116
Magothy formation:		
Clay, sandy, light brownish-gray; fine gray sand, sugary; pyrite and marcasite concretions; wood	10	126
Sand, fine; a little clay; sand, gray sugary; wood	15	141
Sand, fine to medium coarse, gray; little wood	1	142
Sand, light gray, micaceous; little wood	3	145
Sand, fine, light gray; sand ranges in size from very fine to medium pebbles (15 mm); pebbles, quartz, milky and clear; sand, sugary; a little wood	5	150
Sand and medium pebbles; similar to 145–150 ft. interval	5	155
(Samples missing)	4	159
Ce-Dd 55 (Altitude: 30 feet)		
Wicomico formation:		
Clay and sand, white, pale brown	16	16
Clay, sticky, very pale orange	10	26
Sand, weak yellowish-orange, very coarse- to medium-grained, iron-stained; much quartz, cloudy or gray	4	30
Sand and gravel, weak yellow-orange	5	35
Raritan formation:		
Sandy clay, very pale orange and light brownish-gray	7	42
Sandy clay, light brownish-gray; sand, fine	5	47
Sand, light brownish-gray, fine, slightly micaceous	2	49
Sandy clay, light brownish-gray	15	64
Sandy clay, variegated, weak reddish-orange, yellowish-white	8	72

TABLE 51—*Continued*

	Thickness (feet)	Depth (feet)
Clay, sandy, weak yellowish-orange	7	79
Clay, sandy, light brownish-gray	1	80
Clay, light brownish-gray	10	90
Clay, pale brown	20	110
Clay, variegated, pale brown	2	112
(Sample missing)	5	117
Sand, weak yellowish-orange, poorly sorted, coarse- to very fine-grained	10	127
Ce-Dc 11 (Altitude: 28 feet)		
Talbot formation:		
Sand and clay, weak yellowish-orange; sand chiefly medium-grained quartz, also fine- and coarse-grained fairly common; some chert	18	18
Matawan formation:		
Clay, sandy, pale brown, very micaceous; muscovite flakes, very fine- to medium-grained; light and yellowish green grains of glauconite, common; much wood	7	25
Clay, sandy, similar to above, except muscovite not common	5	30
Clay, sandy, light gray and pale brown; sand, medium gray, chiefly very fine-grained but fine- and medium-grained also fairly common; quartz grains, sugary, clear; mica and wood fragments, abundant	5	35
Clay, light gray and pale brown; quartz, rare; siderite pellets, abundant; pieces of bone, rare	5	40
Clay, light brown; quartz, rare; siderite pellets, abundant	5	45
Sand, very pale orange, chiefly hard cemented aggregates of quartz and glauconite; quartz, dull, rounded; wood fragments, fairly common	5	50
Magothy formation:		
Sand, fine-grained, light gray, sugary; wood, abundant	10	60
Sand, similar to above, but siderite pebbles common	7	67
Ce-Dc 14 (Altitude: 28 feet)		
Talbot formation:		
Sand, weak yellowish-orange; some clay; sand, quartz, medium-coarse grained, chiefly clear, some milky grains; iron-staining, common	16	16
Sand, white, some clay; sand, medium-grained to gravel; gravel, milky and clear quartz, chert, and porphyry; muscovite, in medium-grained flakes, rare	23	39
Matawan formation:		
Silt and clay, medium olive-gray, very micaceous	10	49
Magothy formation:		
Sand, pinkish gray, fine- to very fine-grained; sand, quartz, sugary; many wood fragments	20	69
Magothy and Raritan formations:		
Clay, sand, and gravel; sand and gravel, light gray; sand, in part, sugary; siderite pellets and cement, rare	18	87

TABLE 51—*Continued*

	Thickness (feet)	Depth (feet)
Raritan formation:		
Sand, coarse, weak orange; much siderite	11	98
Clay and some sand; clay, red, white, yellow; sand, medium- to coarse-grained, weak orange; siderite-cemented aggregates, fairly common	8	106
Sand, medium- to coarse-grained, weak orange; quartz grains, rough, chiefly clear to partly cloudy	14	120
(Samples missing)	4	124
Ce-Ec 6 (Altitude: 10 feet)		
Talbot formation:		
Sand and gravel, weak yellowish-orange; sand, coarse and very coarse; quartz, clear, shiny, and dull; gravel ½-inch to 1½-inches; a little chert, quartzite and vein quartz	14	14
Magothy formation:		
Clay, light brownish-gray; a little sand, coarse to very fine; a little mica	20	34
Sand, white, sugary, chiefly medium-grained, but coarse and fine fairly abundant; muscovite common	21	55
Ce-Ee 3 (Altitude: 70 feet)		
Wicomico formation and Aquia greensand:		
Greensand, silty, light yellowish-brown; glauconite, fine-grained; some clay	40	40
Aquia greensand:		
Sand and clay; sand, coarse- to fine-grained; a little glauconite	10	50
Sand, some silt; light brown, medium- to coarse-grained, slightly glauconitic	10	60
Sand, light brown, medium to very coarse, slightly glauconitic; some silt	20	80
Monmouth formation:		
Sand, silty, light yellowish-brown, slightly glauconitic; sand, medium- to very coarse-grained	10	90
Clay, sandy, slightly glauconitic	10	100
Monmouth and Matawan formations:		
Sand, silty, light brownish-gray and light olive-gray; glauconite, medium-grained chiefly, some coarse and fine; mica rare; shell fragments fairly common	70	170
Sand and clay, light yellowish-gray, very calcareous, chiefy medium-grained sand; shell fragments rare	60	230
Sandy clay, light yellow-gray, micaceous; shell fragments	60	290
Magothy formation:		
Sand, yellowish white, sugary, wood common; some fine-grained mica; much milky quartz	30	320
Raritan (?) formation:		
Sand, yellowish gray, chiefly coarse-grained, some medium- and very coarse-grained; grains of pinkish quartz; opaque grains	16	336

TABLE 51—*Continued*

	Thickness (feet)	Depth (feet)
Ce-Ec 7 (Altitude: 35 feet)		
Wicomico formation:		
Sandy clay, moderate yellow, slightly glauconitic	10	10
Aquia greensand:		
Sand, weak yellowish-orange, chiefly medium-grained, but fair amount of coarse-grained, glauconitic; glauconite, fine-grained; a little fine mica	30	40
Monmouth formation:		
Greensand, moderate olive-brown, medium- to coarse-grained; glauconite, much oxidized, fine-grained	20	60
Greensand, dark greenish-gray, medium-fine grained; a few shell fragments; teeth (reptilian?); fine muscovite	10	70
Sandy clay, dark greenish-gray, glauconitic	10	80
Greensand, silty, dark greenish-gray, medium-grained; shell fragments; glauconite, fine-grained	10	90
Greensand, silty, light olive-gray, medium-grained	20	110
(Sample missing)	10	120
Greensand, medium-grained; shell fragments common; a fragment of *Belemnitella*	20	140
(Sample missing)	10	150
Greensand, medium-grained; shell fragments	10	160
Monmouth and Matawan formations:		
Clay, sandy, dark greenish-gray, glauconitic, slightly micaceous	90	250
Matawan formation:		
Clay, sandy, dark greenish-gray, micaceous, glauconitic; sand, fine-grained	10	260
Sand, very silty, micaceous, glauconitic	10	270
Magothy formation:		
Sand, yellowish gray, medium-grained, some coarse-grained	12	282
Ce-Ee 10 (Altitude: 85 feet)		
Wicomico formation:		
Sand, clay, soil, pale orange	20	20
Sand, coarse, a little gravel, chert pebbles	15	35
Monmouth formation:		
Sand, weak yellowish-orange, medium-grained; some clay	75	110
Matawan formation:		
Sandy clay, greenish black, glauconitic, slightly micaceous	25	135
Sand, silty, light yellowish-brown, medium to very coarse-grained, glauconitic	6	141
Ce-Ee 11 (Altitude: 80 feet)		
Wicomico formation:		
Sand and clay, moderate yellowish-brown	10	10
Sand, moderate yellowish-orange	10	20
Aquia greensand:		
Sand, moderate yellowish-orange; glauconite, rare	10	30
Sand, moderate yellowish-orange	10	40

TABLE 51—*Continued*

	Thickness (feet)	Depth (feet)
Monmouth formation:		
Sand, dark yellowish-brown; clay; a few shell fragments; sand chiefly medium-grained, clear, sugary quartz grains; glauconite about 15 per cent of sand, fine, dull, dark green and greenish gray, a few grains botryoidal, but most irregular or pellet-like; pyrite, rare; small ovoid grains, gray or brown, rare	30	70
Greensand, olive-gray, medium-coarse; contains about 60 percent glauconite, dull, dark green, and gray; some grains botryoidal; fine quartz grains, sugary; coarse grains, brownish in part; a little milky quartz; ovoid grains, rare	20	90
Greensand, moderate olive-gray, silty; glauconite, about 40 percent of total, dull, dark greenish-gray; a few grains of yellow-green glauconite; quartz, clear; some yellow grains; pyrite rare; a few shell and bone fragments; foraminifera	30	120
Sand, moderate olive-gray, some clay; shell fragments, fairly common; glauconite, about 10 percent, fine; quartz, clear, sugary and also yellow-brown, medium- to fine-grained; ovoid rare; bone, rare; pyrite, rare; mica, fairly common	50	170
Matawan (?) formation:		
Sand, silty, dark yellowish-brown, micaceous; rare shell fragments; glauconite, little, fine-grained, lightish green and dark green, smooth; quartz clear and yellow	30	200
Sand, very silty and very micaceous; sand, fine-grained; little glauconite; some hard aggregates of cemented glauconite grains	40	240
Sand and clay, olive-gray, micaceous; a few shell fragments; sand, dark yellowish-brown, medium- to fine-grained; quartz, mostly clear, but some iron-stained; glauconite about 10 percent in medium-grain and 20 percent in fine-grained sizes; glauconite, dull, dark green and light yellow-green	10	250
Magothy formation:		
Sand, pinkish gray, medium fine-grained, fairly micaceous; wood fragments; pyritized wood and pyrite common; quartz, clear, sugary	24	274

Table 52

Logs of Wells in Kent County from Which Cuttings Were Obtained

	Thickness (feet)	Depth (feet)
Ken-Ac 5 (Altitude: 70 feet)		
Wicomico formation:		
(Sample missing)	10	10
Sand and gravel, weak yellowish-orange; gravel to ½-inch; sand, coarse	10	20
(Sample missing)	20	40
Sand, weak yellowish-orange, medium-coarse, slightly micaceous	10	50
Sand and gravel, weak yellowish-orange; gravel to ½-inch	30	80
Raritan formation:		
Sandy clay, yellowish gray, micaceous; a few wood fragments	10	90

TABLE 52—*Continued*

	Thickness (feet)	Depth (feet)
(Sample missing)	10	100
Sand, medium-fine, weak yellowish-orange, micaceous	10	110
Ken-Ad 32 (Altitude: 70 feet)		
Wicomico formation:		
Sand, moderate yellowish-brown and a little silt; washed—sand very coarse- to medium-grained; fair muscovite; quartz grains clear to milky, iron-stained	20	20
Sand, coarse and granule size, moderate yellowish-brown; washed—sand chiefly medium-grained but much coarse and very coarse; some muscovite; quartz chiefly clear, rounded grains	30	50
Magothy formation:		
Sand, pale yellowish-brown, micaceous, carbonaceous; washed—sand fine- and medium-grained, micaceous (contaminated with Pleistocene material)	10	60
Clay, light olive-gray, micaceous, washed—no sand	20	80
Sand, pale yellowish-brown, sugary, micaceous; wood fragments; washed—sand, fine, very micaceous	17	97
Sand, yellow-gray, chiefly medium-grained but also some coarse- and very coarse-grained; quartz in part sugary	7	104
Ken-Af 1 (Altitude: 70 feet)		
Wicomico formation:		
(Sample missing)	10	10
Sand, light yellowish-orange, medium- to coarse-grained; chiefly clear quartz	10	20
Sand, light yellowish-orange, medium- to coarse-grained; some very coarse sand and gravel	10	30
Sand and gravel (to 25 mm)	10	40
Aquia greensand:		
Sand, light orange, medium-grained	10	50
Monmouth formation:		
Greensand, moderate yellowish-orange, medium- to fine-grained; quartz clear, iron-stained; glauconite, about 30 per cent, dark, dull green	40	90
Greensand, moderate yellowish-orange, chiefly medium-grained, but much coarse-grained; shell fragments fairly common; much yellow quartz; glauconite, chiefly fine- or very fine-grained	30	120
Ken-Af 18 (Altitude: 60 feet)		
Wicomico formation:		
(Sample missing)	20	20
Aquia greensand:		
Greensand, light olive, medium coarse-grained; gray, some clay	10	30
Sand and clay, dusky yellowish-orange; sand chiefly medium-grained, but much coarse and very coarse-grained; very coarse material chiefly brown, shiny, rounded quartz (?) grains and a little dark-		

TABLE 52—*Continued*

	Thickness (feet)	Depth (feet)
green glauconite; coarse portion similar but also contains about 10 percent dull green glauconite; medium-grained portion about 20 percent glauconite, both light and dark	20	50
Sand, weak orange, chiefly medium-grained; similar to preceding interval but more brown glauconite, and iron-stained; glauconite somewhat less	48	98
Ken-Af 19 (Altitude: 60 feet)		
Aquia greensand:		
No samples; old dug well	55	55
Greensand, dusky yellowish-orange, medium-coarse-grained; a few shell fragments; quartz(?) smooth, yellow brown; glauconite, smooth, brown, altered; a little dark-green glauconite in coarse portion; in medium portion, brown and green glauconite	20	75
Ken-Bd 2 (Altitude: 70 feet)		
Wicomico formation:		
Sand, medium-grained, weak orange; quarz, clear and cloudy; a few grains of glauconite, black	2	2
Sand, medium- to coarse-grained, light yellowish-orange; opaque minerals, fairly common	17	19
Gravel and coarse sand, dark yellowish-orange	15	34
Matawan formation:		
Sand, pale yellowish-brown, chiefly medium- and fine-grained, but also some coarse and very coarse-grained; quartz grains, clear, shiny, rounded to angular; glauconite, fine and very fine, rare	11	45
Sand, dark yellowish-brown, medium- and fine-grained, a little coarse-grained; coarse quartz, irregularly pitted, clear; dark gray ovoid grains of unknown origin; very little glauconite, fine and very fine; a few hard aggregates	21	61
Sand and gravel, dark yellow-brown; about equal parts medium-, coarse-, very coarse-, and granule-grained; granules and gravel are aggregates; very coarse, rounded milky quartz grains and aggregates; glauconite, rare; medium-grained about 25 percent glauconite, dark green, yellowish green, light green; ovoids, few	17	78
Sand, light olive-gray, chiefly medium-grained quartz; glauconite rare; ovoids common	10	88
Sand, medium gray, medium-grained; glauconite, coarse, green-black; quartz chiefly clear; ovoids rare; mica flakes, rare; bone fragments, rare	10	98
Ken-Bf 41 (Altitude: 40 feet)		
Wicomico formation:		
Sand, coarse; gravel to 1-inch diameter	10	10
Sand, silty, weak yellow-orange; coarse gravel to ½-inch; polished chert pebbles	10	20

TABLE 52—*Continued*

	Thickness (feet)	Depth (feet)
Calvert formation:		
Clay, yellowish gray; little sand	10	30
Aquia greensand:		
Mixed gray clay and olive-brown greensand; sand, medium-coarse; about 30 percent glauconite, dark yellow-green; shell fragments	10	40
Coarse sand, light olive-brown; many granules, glauconitic	46	86
Ken-Cd 6 (Altitude: 65 feet)		
Wicomico formation:		
Clay, pale yellowish-orange	12	12
Sand, dark yellowish-orange; pebbles	7	19
Aquia greensand:		
Clayey sand, dark yellowish-orange	41	60
Sand, yellowish orange	12	72
Ken-Cd 13 (Altitude: 30 feet)		
Wicomico formation:		
Sand and clay, weak yellowish-orange	10	10
Gravel, coarse, moderate yellow-brown; some oxidized glauconite	10	20
Aquia greensand:		
Greensand, iron-stained, dark yellow-orange; shell fragments	20	40
Greensand and clay, dark yellow-orange	10	50
Greensand, moderate yellowish-brown	50	100
Monmouth formation:		
Greensand, marl, iron-stained, moderate yellowish-brown	40	140
Greensand, very heavily oxidized	10	150
Greensand, olive-gray	16	166
Ken-Cd 23 (Altitude: 15 feet)		
Talbot formation		
(Sample missing)	65	65
Talbot formation and Aquia greensand:		
Clay, sandy; shell fragments; vivianite (?)	11	76
Aquia greensand:		
Sand, gray, medium coarse-grained; about 10 percent glauconite, mostly fine-grained, dull greenish-gray; quartz, chiefly cloudy; a little mica	19	95
Ken-Cd 29 (Altitude: 20 feet)		
Talbot formation:		
(Sample missing)	20	20
Clay; some coarse sand; shell fragments; vivianite(?)	15	35
Sand, coarse, brownish; some gravel	5	40
Sand, coarse; a little glauconite; a few shell fragments	21	61
Aquia greensand:		
Sand, coarse, dark yellowish-orange; glauconite, about 20 percent, dark	14	75

TABLE 52—*Continued*

	Thickness (feet)	Depth (feet)
Ken-Db 1 (Altitude: 15 feet)		
Talbot formation:		
Sample missing	10	10
Sand, medium gray, medium-grained; micaceous; a little glauconite	20	30
Monmouth formation:		
Greensand, medium coarse-grained; some clay, micaceous; glauconite, shiny, dark and yellowish green	60	90
Matawan formation:		
Greensand, chiefly medium-grained; glauconite, about 20 percent, light and dark green, fine-grained; quartz clear; flakes of iron cement fairly common	30	120
Ken-Db 2 (Altitude: 8 feet)		
Talbot formation:		
Sand, gravel, and clay	30	30
Sand and gravel	15	45
Monmouth formation:		
Sand, light yellow-gray, medium- to fine-grained; coarse quartz and glauconite in aggregates	20	65
Sand, light yellow-gray, medium- to fine-grained; about 15 percent glauconite	20	85
Sand, light olive-gray, medium- to fine-grained; a little coarse-grained glauconite, light and dark green, shiny; much fine glauconite, pellets; quartz clear; an ovoid	30	115
Sand, light olive-gray, chiefly fine, but also much medium-grained; coarse-grained, rare, chiefly aggregates and a few shell fragments, a tooth, and clear rounded quartz, an ovoid, a little pyrite, and a little glauconite; medium-grained portion, clear quartz and 20 percent dark, pellet-like glauconite	10	125
Matawan formation:		
Sand, medium-light gray, medium-fine and very fine-grained, a little coarse-grained; coarse, chiefly dark-gray rounded pebbles, iron crusts, some cloudy quartz, ovoids; glauconite rare; medium-grained, irregular quartz grains, ovoid; glauconite less than 10 percent, some muscovite; fine-grained about 15 percent glauconite; ovoids abundant in interval 135–145 feet	32	157
Sand, light gray, medium- to fine-grained; very coarse, iron-cemented aggregates and a few shell fragments; coarse-grained pitted quartz grains and many ovoids; glauconite, less than 10 percent, mostly in fine-grained portion	13	170
Sand, yellowish gray, chiefly medium- and fine-grained, finely micaceous; coarse, clear rounded quartz grains, an iron-impregnated ostracod, and a Nodosaria, two ovoids, glauconite, rare, medium green; medium-grained, clear quartz, about 10 percent glauconite, dark and light green, botryoidal and pellet-like, ovoids; glauconite about 40 percent of the fine-grained fraction, shiny, light green to dark green	20	190

TABLE 52—*Continued*

	Thickness (feet)	Depth (feet)
Magothy formation:		
Sand, light olive-gray, medium- and fine-grained; micaceous; bits of wood; quartz, chiefly milky; glauconite rare	12	202
Ken-Db 34 (Altitude: 20 feet)		
Talbot formation:		
Sand and clay, weak yellowish-orange; sand chiefly medium-grained, partly cloudy quartz, a little mica; glauconite, rare; quartz slightly iron-stained	12	12
Clay, pale yellowish-brown; a little sand; sand chiefly quartz, a little chert; a few yellow quartz grains	8	20
Sand, coarse, and gravel; gravel to 18 mm., generally 8 mm. or smaller; very coarse portion contains chert, white quartz, some clear quartz; some mica in finer portions	6	26
Sand, coarse, weak yellowish-orange, a little gravel; quartz clear and cloudy, somewhat iron-stained; a little chert	3	29
Clay, yellowish gray; wood; a little sand	10	39
Sand, medium-coarse, yellowish gray; a little chert and mica	13	52
Sand and gravel, medium-grained to pebbles (8–10 mm); pieces coarse wood; chert; quartz, white and cloudy, some grains iron-stained; glauconite rare, medium-grained	8	60
Aquia greensand(?):		
Greensand, light olive-gray, chiefly medium-grained; glauconite, dark greenish to light yellowish-green; quartz generally clear; a little mica; glauconite, about 35 percent	12	72
Greensand, light olive-gray, medium- to coarse-grained; coarse portion about 60 percent glauconite, chiefly dark green; quartz mostly clear, some greenish-stained quartz; a little mica	8	80
Greensand, light olive-gray, gravel, shell fragments and iron-cemented aggregates; chiefly medium-coarse grained; glauconite, dark green, abundant; shells, reworked	7	87
Greensand, light olive-gray, chiefly medium-grained, slightly micaceous; glauconite, dark green, abundant, a few shell fragments	5	92
Greensand, dusky yellow-green, a little clay; many shell fragments, reworked	5	97
Monmouth formation:		
Greensand, light olive-gray, a few shells; sand, chiefly medium-grained; glauconite, dark green, abundant; a tooth	2	99
Greensand, grayish olive-green, similar to preceding interval; pieces of bone fairly common	37	136
(Sample missing)	24	160
Ken-Dc 3 (Altitude: 20 feet)		
Talbot formation:		
Clay, sandy, light brown; sand, poorly sorted; quartz, iron-stained; a little mica; a few grains of glauconite	20	20

TABLE 52—*Continued*

	Thickness (feet)	Depth (feet)
Aquia greensand:		
Greensand, light yellowish-brown, medium-grained, micaceous, much iron staining; glauconite, abundant, dark to lightish green; botryoidal glauconite, dull to partly shiny; fine-grained glauconite, pellet-like; muscovite	20	40
Greensand, light brown, some clay; similar to preceding interval, but in addition many fragments of iron cement	10	50
Greensand, light brown, somewhat more glauconitic than in preceding interval; chiefly medium-grained quartz, much iron-stained; glauconite, about 30 percent, dark green, dull, some brown	10	60
Greensand, dusky yellow-green, medium-grained, many flakes of iron cement; quartz not so greatly stained as in preceding interval; glauconite, abundant, shiny, black-green, botryoidal; pellet-like in fine size	18	78
Ken-Eb 1 (Altitude: 10 feet)		
Talbot formation:		
Sand, light yellowish-brown, medium to very fine; shell fragments; quartz angular to subangular, some grains rounded and etched; a few smooth glauconite grains	23	23
Eocene series (undifferentiated):		
Greensand, almost black; medium- to fine-grained, glauconite, about 85 percent; a little clear, angular quartz	12	35
Greensand, olive-green, coarse to medium; a few grains very coarse; glauconite chiefly fine to very fine, dusky yellowish-green; coarse quartz grains, smooth and rounded, dull; pieces of cemented rock (not lime); many clear quartz grains have greenish tinge	8	43
Aquia greensand:		
Marl, greenish brown, mixed quartz sand and glauconite cemented with lime	29	72
Greensand, dark, medium-grained, very calcareous	20	92
Marl, greenish brown, medium-grained; a little gravel	10	102

Table 53

Logs of Wells in Queen Annes and Talbot Counties from Which Cuttings Were Obtained

QA-Ag 4 (Altitude: 41 feet)		
Wicomico formation:		
Sand, weak orange, medium-grained; a little fine gravel	30	30
Calvert formation:		
Clay, light brownish-gray	10	40
Clay, moderate brown, slightly micaceous	10	50
Sandy clay, moderate brown, slightly micaceous	10	60
(Sample missing)	7	67

TABLE 53—*Continued*

	Thickness (feet)	Depth (feet)
QA-Be 14 (Altitude: 50 feet)		
Wicomico formation:		
Soil and sandy clay, yellowish brown	6	6
Sand, grayish yellowish-orange, medium- and coarse-grained; quartz grains, clear and cloudy, somewhat iron-stained, disk-shaped to spherical, rounded to well-rounded	11	17
Calvert formation:		
Clay, light yellowish-gray and brown, iron-stained, finely micaceous	7	24
Clay, pale yellow-brown, finely micaceous, very little sand	11	35
Aquia greensand:		
Sand, dark yellowish-orange, iron-stained fragments, iron crusts, medium to very coarse; quartz, disk-shaped to spherical; a little glauconite, medium fine, rounded, light and dark green	29	64
Sandy marl, yellowish brown, many lime-cemented aggregates; echinoderm spines, Foraminifera, Bryozoa, shell fragments; quartz, chiefly clear, somewhat rounded; light and dark green, fine-grained glauconite, not abundant	3	67
QA-Bf 5 (Altitude: 29 feet)		
Wicomico formation:		
Sand, fine-grained, weak yellowish-orange	10	10
Clay, gray; a little coarse sand; a few grains of glauconite	10	20
Sand, light brown, iron-stained, medium-coarse; some glauconite grains	30	50
Aquia greensand:		
Sand, light brown, medium fine-grained; a few glauconite grains, fine	10	60
Sand, moderate brown, medium coarse; much glauconite, medium-grained, dull green, dark; quartz greatly iron-stained	10	70
Sand, pale brown, medium fine-grained; quartz; glauconite, fine, about 30 percent	20	90
Sand, light brownish-gray; medium-grained; little glauconite	10	100
Sand, coarse, medium gray; quartz clear and opaque yellow, grains smooth-rounded; glauconite, dark, medium, fairly abundant	10	110
Sand, medium, light olive-gray; glauconite, abundant, fine, dark green	10	120
QA-Ea 22 (Altitude: 20 feet)		
Talbot formation:		
Clay and sand; sand, yellowish orange, medium- to fine-grained quartz; quartz, iron-stained, clear and cloudy; a few glauconite grains	5	5
Silt, medium-light gray	5	10
Silt and sand, medium-light gray; sand, medium-grained; glauconite, black, rare	10	20
Silt and sand, yellowish gray; medium-grained quartz; a little chert; mica; glauconite	16	36

TABLE 53—*Continued*

	Thickness (feet)	Depth (feet)
Sand and gravel; gravel plus 10 mm. granules to medium pebbles; clear or partly cloudy quartz, chert, porphyry; pebbles generally disk-shaped	4	40
Eocene series (undifferentiated):		
Greensand, dark greenish-gray, medium- and coarse-grained; quartz, clear to partly cloudy, some grains green-stained; glauconite, about 65 percent, chiefly medium- and fine-grained, shiny black-green, pellet-like in coarse sizes	10	50
Greensand and clay, dark greenish-gray; poorly sorted; clay, pinkish; quartz, brownish, fairly common in coarse and very coarse sizes; glauconite, black, chiefly medium-grained	8	58
Greensand and clay, moderate olive-gray; sand chiefly coarse-grained, but also much medium-grained; coarse-grained sand, yellowish, quartz, little glauconite; medium-grained sand, dark green, glauconite about 60 percent, dark green, shiny, and a little light green	6	64
Greensand and clay, similar to that in preceding interval; in addition, some iron-cemented aggregates of glauconite; a few shell fragments	4	68
Greensand and silt, moderate olive-green, poorly sorted; some brown quartz(?); glauconite chiefly dark yellow-brown; lime-cemented aggregates of black glauconite, common; a few shell fragments	12	80
Greensand and silt; sand, brown, poorly sorted; lime-cemented aggregates; clear smooth quartz grains; coarse yellow-brown quartz (?) abundant; glauconite chiefly fine, black, pellet-like; olive-brown glauconite rare	8	88
QA-Eb 108 (Altitude: 10 feet)		
Pleistocene, Miocene, and Eocene series:		
(Sample missing)	123	123
Eocene series (undifferentiated):		
Clay, gray	26	149
Nanjemoy formation:		
Clay, brownish (pink) and gray	6	155
Aquia greensand:		
Sand, brownish; hard streaks	5	160
Sand, coarse; a little glauconite	5	165
Sand, fine; very little glauconite	5	170
Sand; lime-cemented streaks	5	175
Marl, hard, lime-cemented sand	14	189
Greensand and marl; a little green clay	8	197
(Sample missing)	8	205
QA-Ec 11 (Altitude: 6 feet)		
Talbot formation:		
Sand, medium-grained, pale orange	20	20
Clayey, sand, medium- to fine-grained, very pale brown	10	30

TABLE 53—*Continued*

	Thickness (feet)	Depth (feet)
Sand and clay, sand medium- to fine-grained, light brownish-gray	10	40
Sand, fine, light brownish-gray	10	50
Eocene series (undifferentiated):		
Greensand, coarse and very coarse	10	60
Greensand, medium-grained; quartz, about 50 percent, clear; glauconite, very dark green	10	70
Greensand; glauconite, dark green, about 50 percent; quartz clear, medium-grained	30	100
Greensand, chiefly glauconite, very dark	60	160
Aquia greensand:		
Greensand; glauconite; some brownish quartz grains	30	190
Marl, fragments of shells; quartz and glauconite grains	40	230
QA-Ec 83 (Altitude: 10 feet)		
Talbot formation:		
Sand and clay, moderate yellowish-brown, iron-stained; quartz, medium- to coarse-grained; a little fine-grained glauconite	6	6
Sand, dark yellowish-orange, rather well sorted, medium-grained, about 15 percent coarse sand; quartz, clear and somewhat cloudy; a little mica	4	10
Gravel, thin streak	1	11
Miocene and Eocene series:		
Clay, gray, a little sand; pieces of pyritized wood; a few white and clear quartz grains; no glauconite	9	20
Clay, gray, carbonaceous; blue phosphate stain; much wood	22	42
Clay, gray, streaks of sand; sand, pale brown, chiefly medium-grained; a little mica; numerous nodules, probably phosphates	10	52
Sand, pale yellowish-brown, medium- and coarse-grained; quartz grains, clear, cloudy, rounded, generally spherical; a little glauconite	11	63
Sand, pale yellowish-brown, medium- and coarse-grained; some granules; a few grains of glauconite	10	73
Eocene series (undifferentiated):		
Greensand, some clay, light olive-gray; medium- and coarse-grained glauconite, about 50 percent, dark green, botryoidal	9	82
Greensand, dark greenish-gray; medium- to coarse-grained; glauconite, fine- to coarse-grained, dark green, about 75 percent	42	124
Greensand, dark greenish-gray, medium- to coarse-grained; quartz grains, rounded to subangular, smooth and pitted, green-stained, clear and cloudy; glauconite, very dark green, botryoidal, smooth, shiny; shell fragments, scarce	13	137
Greensand, greenish brown; very coarse and coarse about 60 percent, medium coarse 35 percent; very coarse quartz grains, brown; glauconite, brown, smooth, polished, rounded, and in finer fractions, chiefly dark green, botryoidal; glauconite about 70 percent of sand	12	149

TABLE 53—*Continued*

	Thickness (feet)	Depth (feet)
Greensand, olive-brown similar to 137–149 ft., but more brown glauconite	14	163
Greensand, weak olive-green, about 50 percent medium-grained, 40 percent coarse-grained; quartz, brown in coarse fractions; glauconite, brown and dark green; shell fragments, recrystallized, fairly common; few lime-cemented aggregates	11	174
Greensand, weak olive-green, medium- and coarse-grained; brown quartz fairly common; glauconite, brown and predominantly dark green	10	184
Aquia greensand:		
Marl, weak brown; fragments of hard lime-cemented rock; quartz grains fairly abundant in aggregate; glauconite, not very common	16	200
QA-Ed 4 (Altitude: 63 feet)		
Wicomico formation:		
Sand, medium- to fine-grained, very pale orange; opaques, fairly abundant	42	42
Calvert formation:		
Sandy clay, yellowish gray; sand, fine-grained	21	63
Sandy clay, shell fragments fairly abundant	36.5	99.5
Sandy clay, olive-gray, shell fragments (Pectens), bone	58	157.5
Clay; some sand; shell fragments, possibly diatomaceous	10.5	168
Nanjemoy (?) formation:		
Greensand, dark bluish-green; glauconite chiefly very dark, but some light yellow-green; little quartz	21	189
Greensand, similar to above except more quartz	42	231
Clay, bluish green, glauconitic	58	289
Greensand; coarse quartz and glauconite	42	331
Greensand; fine-grained glauconite, very little quartz	31.5	362.5
Aquia greensand:		
Greensand, some brown grains	10.5	373
Greensand, much brown quartz (?)	21	394
QA-Fa 48 (Altitude: 12 feet)		
Talbot formation:		
Sand, chiefly medium-grained, pale yellowish-orange; a little clay; quartz grains clear and cloudy, generally rounded to spherical; a few grains of fine glauconite	10	10
Sand, pale yellowish-brown, and a little gray clay; sand, quartz, clear and cloudy, medium-grained, and a fair amount of fine- and coarse-grained; a little glauconite	10	20
Sand, pale yellowish-brown, and a little clay; sand, quartz, medium-grained, a fair amount of coarse-grained; iron-cemented aggregates; quartz chiefly cloudy, somewhat iron-stained	12	32
Sand, coarse, pale yellowish-brown, and a little clay; sand, quartz, chiefly cloudy or milky, medium and coarse-grained; chert, fairly common; glauconite, very rare	6	38

TABLE 53—*Continued*

	Thickness (feet)	Depth (feet)
Clay, sandy, dark yellowish-brown; sand, quartz, chiefly medium-grained, cloudy and clear; mica, fairly common; glauconite, none	2	40
Calvert formation and Eocene series (undifferentiated):		
Clay, sandy, gray; clay when washed shows a fair amount of sand; sand, generally clear quartz, glauconite rare, a little chert, some battered shell fragments	21	61
Clay, sandy, gray; washed, shows little sand, some vivianite (?), stained wood fragments	11	72
Clay, sandy, gray; washed shows a fair amount of sand, chiefly medium-grained; quartz, clear and cloudy; a fair amount of light green, fine-grained glauconite; pieces of wood stained with vivianite (?)	10	82
Sand and clay, moderate olive-brown; sand chiefly medium-grained; light yellowish quartz fairly common; glauconite, fine-grained, rare	10	92
(Sample missing)	11	103
Eocene series (undifferentiated):		
Greensand, olive-gray, medium-grained about 60 percent, coarse- and fine-grained, 20 percent each; quartz chiefly clear, much stained green; glauconite, dark green, medium- to very fine-grained	21	124
Greensand, dusky yellowish-green; about 50 percent glauconite, rest quartz; medium- and coarse-grained sand, about 80 percent; glauconite, very dark green, smooth, botryoidal, chiefly medium- to fine-grained	11	135
Greensand, similar to above, but somewhat finer-grained and somewhat more glauconite; a little clay at places	41	176
Aquia greensand (?):		
Greensand; a little clay; dusky yellowish-green; sand coarse- and medium-grained; many yellow grains in coarse and very coarse sizes; glauconite, dark green, shiny, botryoidal	11	187
Sand and clay, dusky yellowish-green, sand chiefly coarse and very coarse, about 25 percent medium-grained; coarse fraction, chiefly brown quartz (?), smooth; a little glauconite, black; shell fragments with adhering glauconite grains; medium fraction has somewhat less brown quartz (?) and more glauconite; about 20 percent glauconite	11	198
Sand and clay, dusky yellowish-green; sand, medium and fine about 65 percent, coarse and very coarse 35 percent; constituents similar to those in preceding interval	27	225
Sand and clay, dusky yellowish-green; sand, coarse- and medium-grained; quartz, about 70 percent; glauconite about 30 percent; glauconite, dark green; much yellow quartz; some green-stained quartz; pieces of shell; a battered Nodosaria	6	231
Sand and clay, dusky yellowish-green; sand, chiefly quartz; glauconite about 25 percent sand, medium and fine about 65 percent, coarse about 35 percent; quartz, chiefly clear, some yellow; glauconite predominates in fine-grained size; reworked or poorly preserved Foraminifera in fine-grained fraction	3	234

TABLE 53—*Continued*

	Thickness (feet)	Depth (feet)
Sand and clay, dusky yellowish-green, about 50 percent each, medium- and coarse-grained; constituents similar to those in preceding interval; a little wood stained with vivianite (?)	9	243
Sand and clay, dusky yellowish-green; fine- and medium-grained sand about 60 percent, coarse 40 percent; coarse contains hard lime-cemented aggregates of quartz and glauconite; yellow quartz, common; glauconite, about 40 percent of the sand	18	261
Tal-Cb 89[1]—Wades Point (Altitude: 13 feet)		
Nanjemoy formation:		
Greensand, chiefly coarse- and very coarse-grained, some medium-grained; glauconite mostly medium- and fine-grained; quartz grains chiefly smooth, shiny, many green-stained; a few pieces of hard lime-cemented quartz and glauconite grains; glauconite, chiefly greenish black, botryoidal	55	305
Aquia greensand:		
Greensand, yellow-brown; chiefly coarse- and very coarse-grained; fair amount medium- to fine-grained; coarse material, light yellowish-brown to dusky yellowish-orange; medium- to fine-grained, very dark greenish-black; yellow-brown grains (quartz?), lime-cemented aggregates, a few fragments of weathered shells; brown glauconite, rarely very coarse; green-black and brown glauconite about equal in coarse-grained portion, dark green glauconite abundant in medium- and fine-grained	15	320
Marl, shell fragments, similar to preceding interval, but much more shell material	25	345
Greensand, brown; few shell fragments	29	374
Marl, chiefly shell fragments	102	476
Marl, chiefly medium-grained; shell fragments common; glauconite, about 20 percent, green-black; much yellow quartz (?); glauconite chiefly fine-grained	49	525
Greensand, chiefly medium-grained quartz; many shell fragments and lime-cemented aggregates; quartz, chiefly clear; glauconite green-black, about 40 percent of material	11	536

[1] This well lies very close to the south boundary of Queen Annes County.

The Surface-water Resources

BY

ARTHUR E. HULME

Introduction

The principal streams in Cecil, Kent and Queen Annes Counties flow either in a southerly or westerly direction and drain into Chesapeake Bay. All the primary streams are tidal in their lower reaches and many of them, excepting those in upper Cecil County, are affected by tide throughout a greater part of their length. Many of the tributary streams are also affected by tide.

The relief in Queen Annes County ranges from sea level to 20 feet above on Kent Island and in the western part of the county rises from sea level to near 60 feet above in three or four miles. In the central and eastern parts elevations range from a few feet above sea level along the river banks to about 80 feet above. Kent County ranges from near sea level along Chesapeake Bay and Chester and Sassafras Rivers to a high ridge that forms the backbone of the county between the two rivers and extends east and west almost the length of the county, continuing into Delaware on the east and tapering off at the western end. It has an elevation of about 80 feet throughout its length. Cecil County ranges in elevation from near sea level along the shores of Chesapeake Bay and the larger rivers in the area south of the Chesapeake and Delaware Canal to 80 feet above; the northern part of the county is much more rugged and ranges from near sea level along the Bay and estuary streams to over 500 feet in the northwest section near Rock Springs about a mile south of the Pennsylvania State line.

The large streams in the area south of the Chesapeake and Delaware Canal are rather sluggish but some of the small upstream tributaries are rather flashy. All streams in Cecil County north of the canal in areas not affected by tide are of a flashy runoff nature.

Many small grist mills were operated in the past, as evidenced by the many mill ponds throughout the area, but most of the mills are no longer in operation. Many of the ponds are now used for recreational purposes.

The important streams and their drainage areas at selected points are listed in Table 54, based chiefly on data in the "Report to the General Assembly of Maryland by the Water Resources Commission of Maryland, January 1933". The principal streams are shown in figure 17.

STREAMFLOW MEASUREMENT STATIONS

Gaging stations are classified broadly as complete-record gaging stations and partial-record gaging stations. Eleven complete-record stations are operated in the tricounty area in cooperation with the Maryland Department of Geology, Mines and Water Resources and other State and Federal agencies; one in Delaware is also included as it is on a stream which drains a small area along the extreme eastern edge of Cecil County. Six partial-record stations were operated from October 1952 to September 1953.

Discharge measurements, or measurements of flow (Pl. 12, figs. 1, 2), are

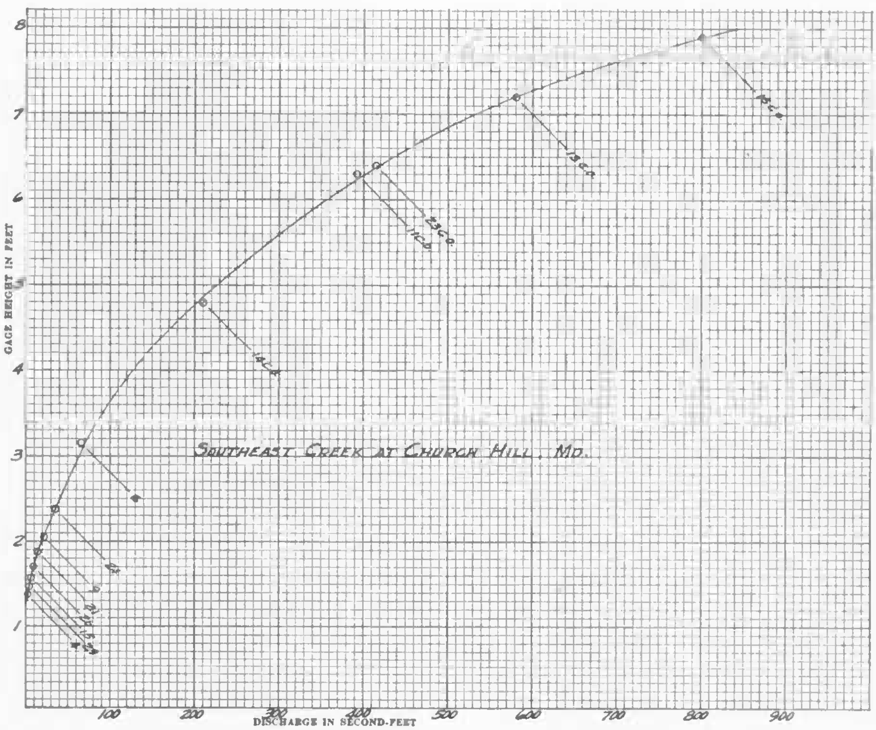

FIGURE 15. Typical Rating Curve showing Relation between Stage and Discharge at a Stream-gaging Station

made periodically and at various stages of the stream in order to derive a stage-discharge relation for the station. After establishing a stage-discharge relation, the discharge for any stage can be determined provided the channel conditions remain stable. A typical discharge rating curve is illustrated in figure 15.

The selection of a gaging station site requires careful appraisal of various conditions: the stability of the stream channel; height of banks, their relative freedom from overflow, and suitability of conditions for installation and maintenance of gage structures; and the range in stage within which current-meter measurements can be obtained by wading and the availability and accessibility of structures suitable for use in making measurements at higher stages. The site selected may not meet all requirements. An artificial control, or modified type of weir, may be necessary in order to stabilize the stage-discharge relation, especially for low flows. For a channel subject to shifting, where a control is not practical, more frequent measurements are required to define the stage-discharge relation. A cableway or an auxiliary foot bridge may be required in order to make current-meter measurements at stages higher than can be waded.

There are two principal types of gaging stations, recording and non-recording. A recording station is equipped with an instrument called a water-stage recorder that records a continuous graph of the stage. Graphs of river stages from automatic water-stage recorders are illustrated in figure 16. A non-recording station usually is equipped with a vertical staff, a wire-weight gage, or reference point from which readings are made. All of the complete-record stations in Maryland are recording stations, but the partial-record stations are non-recording.

Two types of recorder structures are in use in the tricounty area, the permanent and the temporary. The permanent-type structures (Pl. 13, fig. 1) are of concrete-block construction, inside dimensions 4 ft square, connected to the stream by one or more horizontal pipes, so that the water level in the well can fluctuate with the level in the stream. The gage wells are equipped usually with a flushing device for cleaning silt out of the intake pipes. Other equipment includes steel doors, ventilators, built-in instrument shelf, and the recording instrument. The height of the structure is determined by the height of anticipated floods. The temporary type structure (Pl. 13, fig. 2) is a smaller structure composed of corrugated iron culvert pipe placed in a vertical position to act as the stilling well with a small box-like wooden shelter fastened thereon in which the recorder is placed. This structure is used where short-term records are anticipated as most of the materials can be salvaged and reused.

In most cases, monthly inspection in order to remove the chart, wind the clock, and flush intakes is all the attention required, except for a yearly maintenance trip to remove silt from the well and make general repairs.

The collection of a satisfactory record of stage or gage-height is only one phase of gaging station operation; obtaining an adequate number of reliable discharge measurements to define the stage-discharge relation is an equally important phase.

Discharge measurements at the stations in the tricounty area generally are made by wading, except at high stages when the depth and velocity observations are taken by suspending the current meter and sounding weights from a bridge at the station. Measurements usually are made periodically on routine trips, the frequency at a given station depending upon the stability of the rating. At a station equipped with an effective artificial control, the rating may need to be checked only bi-monthly or even less frequently. On the other hand,

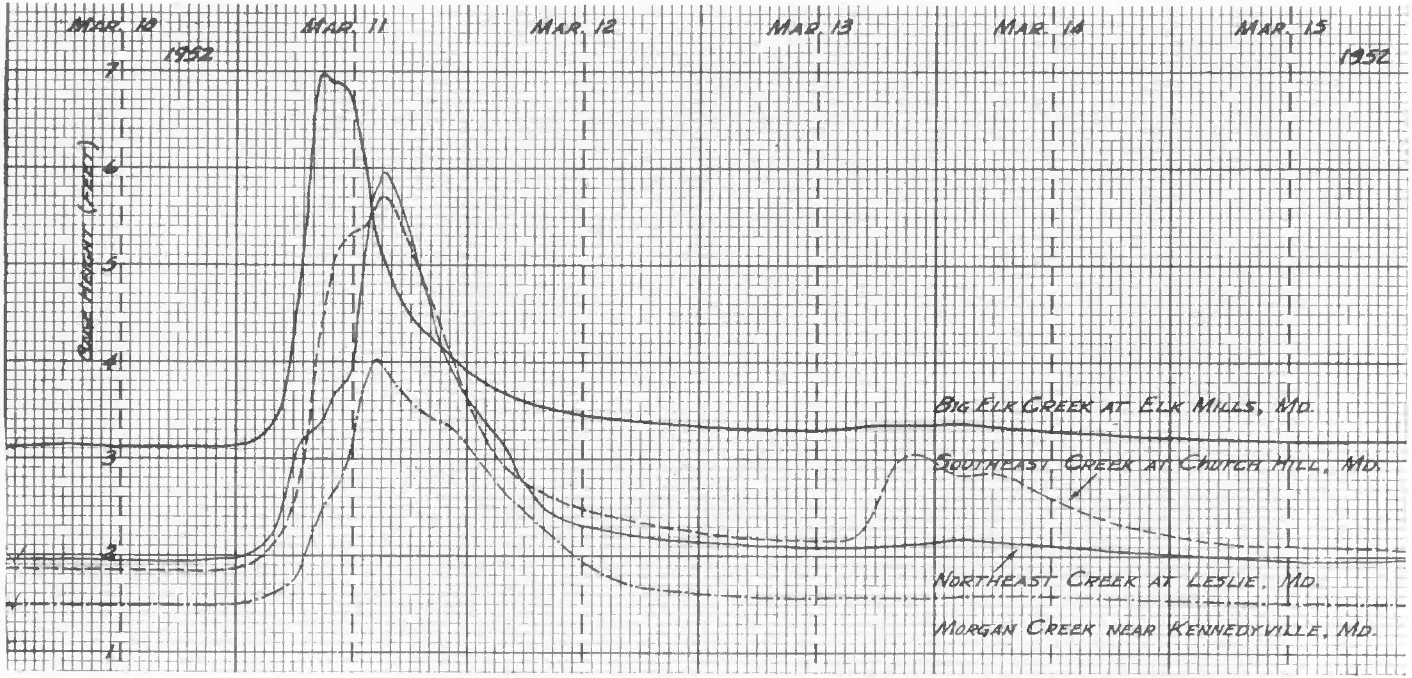

FIGURE 16. Graphs of River Stages from Automatic Water-stage Recorders

a station with an unstable stream bed subject to shifting, or affected by backwater from weeds or other sources, may require measuring bi-weekly or more often. Special trips usually are required to obtain measurements with which to define the extreme low water and high water portions of the station rating curves.

Daily discharge records for gaging stations on the Eastern Shore of Maryland are published in annual water-supply papers of the U. S. Geological Survey called "Surface Water Supply of the United States", Part 1, or in Part 1B subsequent to 1950.

DEFINITION OF TERMS

Explanations of some of the technical terms used in stream flow records are:

Second-feet.—A term used in expressing the rate of flow. It is synonymous with "cubic feet per second (commonly abbreviated "cfs")." A cubic foot per second is the rate of discharge of a stream whose channel is 1 square foot in cross-sectional area and whose average velocity is 1 foot per second.

Discharge.—A rate of flow of water, usually expressed in second-feet. One second-foot flowing for one day equals 86,400 cubic feet, or 646,317 gallons.

Second-feet per square mile.—An average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the runoff is distributed uniformly as regards both time and area.

Million gallons per day per square mile.—An average number of gallons of water flowing per day from each square mile of area drained, on the assumption that the runoff is distributed uniformly as regards both time and area. One million gallons per day equals 1.5472 cubic feet per second.

Runoff in inches.—The depth to which an area would be covered if all the water draining from it in a given period were uniformly distributed on its surface.

Drainage basin.—The area drained by a stream or stream system, usually expressed in square miles.

Water year.—A special annual period selected to facilitate water studies, commencing October 1 and ending September 30. The minimum flow of most streams usually occurs near the end of the water year.

GAGING STATIONS IN CECIL, KENT, AND QUEEN ANNES COUNTIES

Complete-record Gaging Stations

All of the streams are tributary to Chesapeake Bay except Christina River which drains into the Delaware River (Table 54). The first gaging station operated in this area was on Octoraro Creek at Rowlandsville. It was established in 1896 and discontinued in 1899. The longest streamflow records are those for Octoraro Creek near Rising Sun and Big Elk Creek at Elk Mills. Established

TABLE 54

Drainage Areas of Streams in Cecil, Kent, and Queen Annes Counties

Drainage basin and name of stream	Tributary to:	Drainage areas in square miles			
		Total	In Maryland	Outside Maryland	At USGS Gage
Delaware River Basin					
Christina River Basin in Maryland	Delaware River	7.85	7.85		
Christina River at Coochs Bridge, Delaware	do.	20.5	7.85	12.6 (D&P)	20.5
Choptank River Basin					
German Branch near Hope	Tuckahoe Creek	15.3	15.3		
German Branch at mouth	do.	24.0	24.0		
Wye River Basin					
Wye East River at Wye Mills	Wye River	10.2	10.2		
Sallie Harris Creek at Carmichael	Wye East River	8.09	8.09		8.09
Wye East River below Sallie Harris Creek near Wye Mills	Wye River	24.4	24.4		
Wye River at mouth (Bennett Point)	Eastern Bay	90.6	90.6		
Chester River Basin					
Andover Branch at Delaware State line (head of Chester River)	Chesapeake Bay	9.65	.66	8.99 (D)	
Sewell Branch at Delaware State line	Chester River	14.1		14.1 (D)	
Sewell Branch at mouth	do.	18.8	3.4	15.4 (D)	
Cypress Branch at Delaware State line	do.	14.3		14.3 (D)	
Cypress Branch at mouth	do.	35.0	19.4	15.6 (D)	
Mills Branch near Millington	do.	9.98	9.98		*9.98
Chester River above Unicorn Branch	Chesapeake Bay	95.4	54.1	41.3 (D)	
Unicorn Branch near Millington	Chester River	22.3	22.3		22.3
Unicorn Branch at mouth	do.	22.7	22.7		
Red Lion Branch at mouth	do.	24.4	24.4		
Foreman Branch at Ewingville	do.	5.27	5.27		*5.27
Morgan Creek near Kennedyville	do.	10.5	10.5		10.5
West Branch Morgan Creek near Kennedyville	Morgan Creek	8.29	8.29		
Morgan Creek at mouth	Chester River	32.4	32.4		
Southeast Creek at Church Hill, above unnamed Branch (2.5 miles upstream from Browns Branch)	do.				
Branch of Southeast Creek at mouth at Church Hill (2.5 miles upstream from Browns Branch)	Southeast Creek	7.85	7.85		
Southeast Creek at Church Hill (0.9 miles east)	Chester River	12.5	12.5		12.5
Southeast Creek at Church Hill	do.	14.2	14.2		
Island Creek above Granny Finley Branch	Southeast Creek				
Granny Finley Branch at Starkley Corner	Island Creek	7.14	7.14		
Island Creek at mouth	Southeast Creek	22.7	22.7		
Southeast Creek at mouth	Chester River	54.5	54.5		
Corsica River at Centreville	do.	11.2	11.2		*11.2
Corsica River at mouth	do.	36.3	36.3		
East Fork Branch (head of Langford Creek) Mill Pond Outlet near Langford	Langford Creek	5.10	5.10		*5.10
West Fork Langford Creek at mouth	do.	16.6	16.6		
Chester River at mouth (Long Point)	Chesapeake Bay	446	405	41.3 (D)	
Worton Creek Basin					
Mill Creek at Hanesville (head of Worton Creek)	do.	5.17	5.17		*5.17
Sassafras River Basin					
Sassafras River at Sassafras	do.	17.2	9.68	7.52 (D)	
Jacobs Creek near Sassafras	Sassafras River	5.39	5.39		5.39
at mouth (Howell Point)	Chesapeake Bay	104	96.8	7.52 (D)	

TABLE 54—*Continued*

Drainage basin and name of stream	Tributary to:	Drainage areas in square miles			
		Total	In Maryland	Outside Maryland	At USGS Gage
Elk River Basin					
Big Elk Creek at Pennsylvania State line (head of Elk River)	Chesapeake Bay	41.9	1.0	40.9 (P)	
at Elk Mills	do.	52.6	10.8	41.8 (P)	52.6
at Elkton (Hwy. 281)	do.	61.0	18.6	41.9 (P) 0.5 (D)	
at Elkton (Hwy. 7)	do.	61.8	19.4	41.9 (P) 0.5 (D)	
above Little Elk Creek	do.	63.7	21.3	41.9 (P) 0.5 (D)	
Little Elk Creek at Pennsylvania State line	Elk River	13.1	1.0	12.1 (P)	
Little Elk Creek at Leeds	do.	26.3	14.1	12.2 (P)	
Little Elk Creek at Childs	do.	26.8	14.6	12.2 (P)	26.8
Little Elk Creek below Dogwood Branch	do.	36.2	24.0	12.2 (P)	
Little Elk Creek at mouth	do.	41.9	29.7	12.2 (P)	
Great Bohemia Creek above Little Bohemia Creek (head of Bohemia River)	do.	20.6	12.1	8.51 (D)	
Little Bohemia Creek near Warwick (at St. Francis Xavier Church)	Bohemia River	2.45	2.45		*2.45
Little Bohemia Creek above unnamed North Branch near Warwick	Bohemia River	2.75	2.75		
Unnamed North Branch at Confluence with Little Bohemia Creek at mouth	Little Bohemia Creek	2.38	2.38		
Little Bohemia Creek below unnamed North Branch near Warwick	Bohemia River	5.13	5.13		
Little Bohemia Creek at mouth	do.	14.3	14.3		
Bohemia River at mouth (Town Point)	Elk River	53.4	44.9	8.51 (D)	
Elk River at mouth (Turkey Point)	Chesapeake Bay	267	187	54.1 (P) 26.1 (D)	
Northeast River Basin					
Northeast Creek at Leslie (head of Northeast River)	do.	24.3	17.0	7.31 (P)	24.3
above Little Northeast Creek	do.	25.4	18.1	7.31 (P)	
Little Northeast Creek at mouth	Northeast Creek	18.7	18.2	.50 (P)	
at mouth (Red Point)	Chesapeake Bay	77.8	70.0	7.81 (P)	
Furnace Bay Basin					
Principio Creek at Principio Furnace (head of Furnace Bay)	Furnace Bay	18.4	18.4		
Furnace Bay at mouth (Shipley Point)	Chesapeake Bay	21.0	21.0		
Susquehanna River Basin					
Octoraro Creek at Pennsylvania State Line	Susquehanna River	176	1.2	175 (P)	
Octoraro Creek near Rising Sun	do.	193	34.4	176 (P)	193
Basin Run at Liberty Grove	Octoraro Creek	5.31	5.31		5.31
Octoraro Creek at Rowlandsville	Susquehanna River	210	34.4	176 (P)	210
Octoraro Creek at mouth	do.	210	35.0	176 (P)	

*—Sites of partial-record gaging stations.
D—Drainage area in Delaware.
P—Drainage area in Pennsylvania.
D&P—Combined drainage area in Delaware and Pennsylvania.

in April 1932, both have been in continuous operation except for the period Oct. 1, 1935, to Jan. 14, 1936, when no records were obtained. These missing periods were estimated on the basis of records for nearby stations and are included herein in order that the data for a long-term continuous period might be presented. Another complete-record station was established in January 1948, three in October 1948, one in May 1951, and three in June 1951. All of these stations, except those established in June 1951, are still in operation. The

TABLE 55

Stream-gaging Stations in Cecil, Kent, and Queen Annes Counties

No. on fig. 17	Stream-gaging station	Drainage area (square miles)	Records available*
1	Christina River at Coochs Bridge, Delaware	20.5	Apr. 1943–
2	Sallie Harris Creek near Carmichael	8.09	June 1951–Sept. 1956.
3	Mills Branch near Millington†	9.98	Oct. 1952–Sept. 1953.
4	Unicorn Branch near Millington	22.3	Jan. 1948–
5	Foreman Branch at Ewingville†	5.27	Oct. 1952–Sept. 1953.
6	Morgan Creek near Kennedyville	10.5	May 1951–
7	Southeast Creek at Church Hill	12.5	June 1951–Sept. 1956.
8	Corsica River at Centreville†	11.2	Oct. 1952–Sept. 1953.
9	Mill Pond Outlet near Langford†	5.10	Oct. 1952–Sept. 1953.
10	Mill Creek at Hanesville†	5.17	Oct. 1952–Sept. 1953.
11	Jacobs Creek near Sassafras	5.39	June 1951–Sept. 1956.
12	Big Elk Creek at Elk Mills	52.6	Apr. 1932–
13	Little Elk Creek at Childs	26.8	Oct. 1948–
14	Little Bohemia Creek near Warwick†	2.45	Oct. 1952–Sept. 1953.
15	Northeast Creek at Leslie	24.3	Oct. 1948–
16	Octoraro Creek near Rising Sun	193	Apr. 1932–
17	Basin Run at Liberty Grove	5.31	Oct. 1948–
18	Octoraro Creek at Rowlandsville	210	Nov. 1896–Sept. 1899.

* Stations for which no closing dates are shown are still in operation.

† Partial-record station; intermittent gage heights and discharge measurements only.

complete-record station on Christina River near Coochs Bridge, Delaware, was established in April 1943 and is still maintained.

Drainage areas for streams in the tricounty area and tributary streams in Delaware and the years of record for all gaging stations, both complete-record and partial-record, are given in Table 55, and their locations are shown in figure 17.

Records for the gaging station on Tuckahoe Creek near Ruthsburg which drains areas of both Caroline and Queen Annes Counties and for Mill Creek which flows into the Wye River basin from Talbot County but drains a small area in Queen Annes County were included in the report on Caroline, Dorchester and

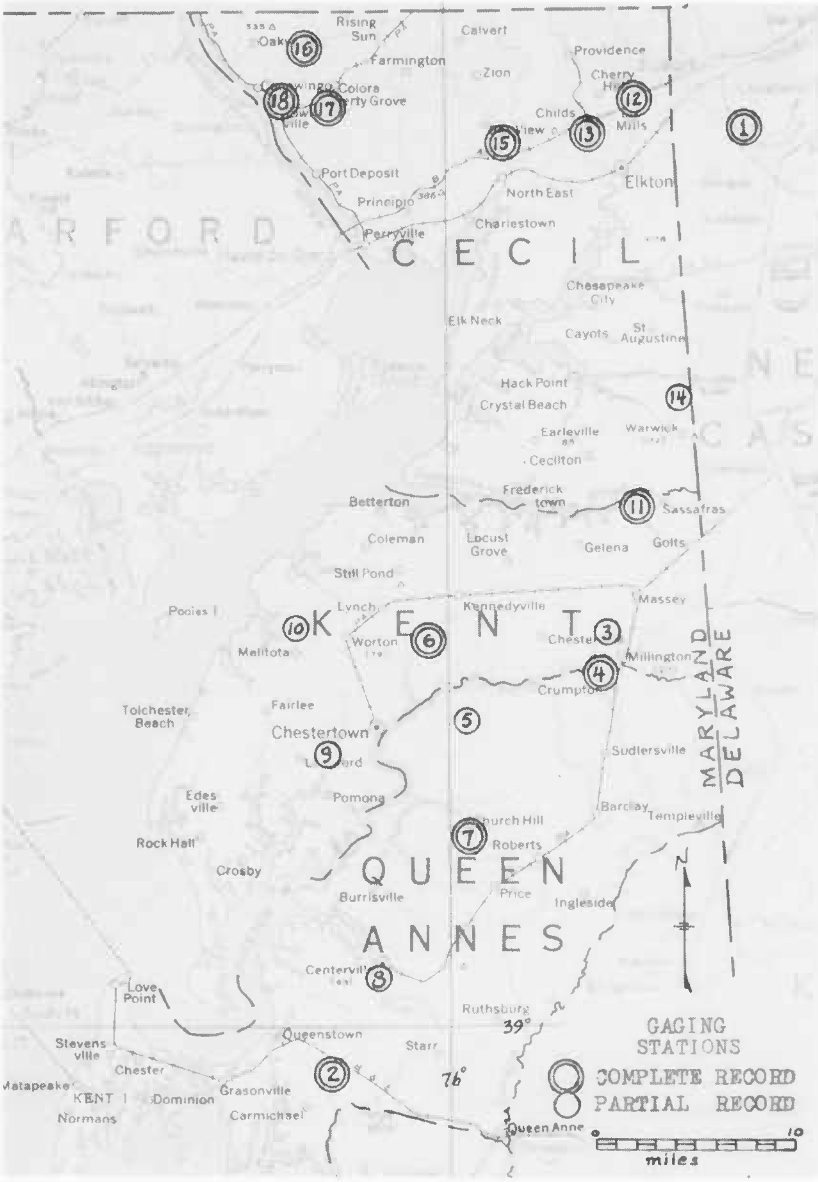

FIGURE 17. Map of Cecil, Kent, and Queen Annes Counties showing Principal Streams and Locations of Gaging Stations

Talbot Counties (Bulletin 18). Records for the Susquehanna River and for Deer Creek, a tributary from the west, are included in the report on Baltimore and Harford Counties (Bulletin 17).

Partial-record Gaging Stations

In order to extend the gaging coverage to provide at least a limited amount of information on as many streams as practicable, six additional gaging sites were selected for operation as partial-record stations—two in Queen Annes County, three in Kent County, and one in Cecil County—and records were obtained for the 1953 water year. Data collected at these sites consisted of current-meter discharge measurements once or twice a month (depending upon the stability of the stage-discharge relationship) and intermittent gage readings. Results of 135 discharge measurements (an average of about 22 per station) are published under "Miscellaneous Discharge Measurements" in U. S. Geological Survey Water-Supply Paper 1272, Part 1B, for 1953.

Computations for Partial-records

The monthly mean discharges for the partial-record gaging stations were derived through correlation with records for complete-record gaging stations. The discharge measurements at a partial-record gaging station were plotted against concurrent discharges at an adjacent complete-record station, a mean curve of relation drawn, and the standard error of estimate determined. Daily discharges for the partial-record station were estimated from those on concurrent days at the complete-record station. The estimated daily discharges were then adjusted by amounts indicated by individual measurements, the adjustments being graduated between measurements on basis of time and discharge. Estimated monthly mean discharges were then computed from these adjusted mean daily discharges.

Tests of the accuracy of this method were made by selecting two daily discharges per month from a complete-record gaging station and assuming them to be results of discharge measurements. These were then correlated with concurrent discharges for another complete-record station and monthly mean discharges for the first station were estimated. These estimates were then compared with the monthly mean discharges computed from actual records. These tests showed that the use of this method results in a standard error of estimate of the monthly discharge from one quarter to one half smaller than that indicated by the plotting of discharge measurements and concurrent discharges. The standard error of estimate of the monthly discharge as given in this report was obtained by reducing the standard error of estimate of the discharge measurements by 30 percent. The standard error of estimate is a statistical measure of the variation or scatter about the line of relation of the points used in the correlation. One standard error measured plus and minus about the line will normally include about two-thirds of the points. It can also be inferred that two-thirds of the estimates made through the use of the line would normally be within one standard error of being correct; about 95 percent of the estimates would be within two standard errors and practically all would be within three. Thus, about two-thirds of the monthly mean discharges estimated for partial-record sites are assumed to be correct within the indicated standard error.

RUNOFF IN THE TRICOUNTY AREA

Maximum Flood Runoff

Based on records for the period October 1926 to September 1956 for nearby gage stations in Maryland and Pennsylvania, the maximum general floods of record occurred in August 1933 and August 1955. Records collected by the United States Weather Bureau show the rainfall for the flood periods for points in or near the tricounty area as follows:

	August 21-23, 1933	August 12-13, 1955
Baltimore	10.98 inches	7.95 inches
Cecilton	7.49	—
Elkton	7.16	7.24
Millington	9.52	6.32

The recorded rainfall for Baltimore on August 12-13, 1955, was the city's highest 24-hour rainfall of record since 1871 when statistical tabulations began.

Although the floods of August 1933 and 1955 were general over Maryland and Delaware, there have been greater local floods. The peak discharge of the flood of August 9, 1942, on Octoraro Creek near Rising Sun was 35,000 second-feet as compared with 34,500 second-feet for August 24, 1933. On Big Elk Creek at Elk Mills the peak discharge for the flood of August 23, 1933, was exceeded by that of July 5, 1937. Detailed information concerning the floods of August 1955 may be found in U. S. Geological Survey Water-Supply Paper 1420, "Floods of August-October 1955, New England to North Carolina."

Minimum Drought Runoff

Extreme drought conditions prevailed throughout Maryland from 1930 to 1934. The drought commenced in 1930 when the State annual precipitation averaged only 24 inches as compared with a 54-year average of 42 inches. For details on drought studies see U. S. Geological Survey Water-Supply Paper 680, "Droughts of 1930-34". Maryland's 1930 drought was the most severe for any State throughout the humid sections of the United States. The 1930 precipitation for Maryland and Delaware in terms of percentage of normal (approximately 57%) was the lowest ever recorded in any of the thirty humid States. Stream-flow records are not available for this tricounty area prior to April 1932.

Average Runoff

Streamflow records for this area span periods generally of only 8 complete years or less. Exceptions are the stations on Christina River at Coochs Bridge, Delaware, with 13 years of record, and Big Elk Creek at Elk Mills and Octoraro

TABLE 56

Average Discharge from Streams in Cecil, Kent, and Queen Annes Counties (in cfs per sq. mi.)

No. on fig. 17	Gaging station	Drainage area (square miles)	Period of record					
			1898 to 1899	1933 to 1956	1944 to 1956	1949 to 1956	1952 to 1956	1953
			Water years					
			2	24	13	8	5	1
1	Christina River at Coochs Bridge, Delaware	20.5	—	—	1.26*	1.23	1.30	1.64
2	Sallie Harris Creek near Carmichael	8.09	—	—	—	—	1.02*	1.32
3	Mills Branch near Millington†	9.98	—	—	—	—	—	1.00*
4	Unicorn Branch near Millington	22.3	—	—	—	1.01*	.991	1.35
5	Foreman Branch at Ewingville†	5.27	—	—	—	—	—	1.22*
6	Morgan Creek near Kennedyville	10.5	—	—	—	—	.927*	1.30
7	Southeast Creek at Church Hill	12.5	—	—	—	—	1.01*	1.37
8	Corsica River at Centreville†	11.2	—	—	—	—	—	1.53*
9	Mill Pond Outlet near Langford†	5.10	—	—	—	—	—	1.43*
10	Mill Creek at Hanesville†	5.17	—	—	—	—	—	.959*
11	Jacobs Creek near Sassafras	5.39	—	—	—	—	.928*	1.31
12	Big Elk Creek at Elk Mills	52.6	—	1.35*	1.27	1.30	1.32	1.74
13	Little Elk Creek at Childs	26.8	—	—	—	1.35*	1.53	1.77
14	Little Bohemia Creek near Warwick†	2.45	—	—	—	—	—	1.31*
15	Northeast Creek at Leslie	24.3	—	—	—	1.37*	1.59	1.87
16	Octoraro Creek near Rising Sun	193	—	1.33*	1.28	1.32	1.34	1.82
17	Basin Run at Liberty Grove	5.31	—	—	—	1.19*	1.17	1.61
18	Octoraro Creek at Rowlandsville	210	1.88*	—	—	—	—	—

* Longest period of record.

† Partial-record station.

Creek near Rising Sun, with 24 years of record. Table 56 summarizes the average discharge in cubic feet per second per square mile for the periods of record for the gaging stations. The table shows considerably higher runoff per square mile for the stations in northern Cecil County with basins in the Piedmont region than for those in the Coastal Plain region. Comparisons of the relatively long-term averages on Christina, Big Elk and Octoraro with the records for the same stations for the 1953 water year show that unit runoff figures based solely on those one-year records included in the report would be too high to represent average yield.

On the basis of the 24-year records for Big Elk and Octoraro Creeks and longer records in Harford County, Maryland, and Chester County, Pennsylvania, which extend through the drought period of the early 1930's, the average runoff for the Piedmont portion of Cecil County may be assumed to be between 1.3 and 1.4 cfs per square mile. The average runoff for the Coastal Plain portion of the area probably is between 0.9 and 1.1 cfs per square mile, an estimate arrived at in part by adjusting the actual short-term runoff figures for the five stations in the Coastal Plain area on the basis of the relationship of the runoff for the same periods on Big Elk and Octoraro Creeks to the 24-year average at those stations.

FLOW-DURATION STUDIES OF BIG ELK CREEK

Flow-duration curves show the percentage of time that various flows throughout the range of discharge experienced were equaled or exceeded. A flow-duration curve may be plotted for any period, but to be representative of the duration of various discharges that may be expected, the flow-duration curve should be derived from continuous long-term records. To be representative of conditions of natural flow, the flow-duration curve should be derived from streamflow records that are not affected by artificial storage, regulation, or diversion.

Data for the gaging station on Big Elk Creek are used as an example of a flow-duration study (Table 57 and figure 18). This station satisfactorily meets the requirements set forth in the preceding paragraph and is representative of natural conditions of the Piedmont streams in the area. Flow-duration studies were made of the daily discharge for each year of record. As the chief purpose of duration studies is to ascertain the sustained flow of a stream, especially during periods of low water, the yearly period beginning April 1 was arbitrarily adopted rather than the water year ending September 30, so that the duration of the customary seasonal low-water period during the fall months and any prolonged seasonal drought are contained within a single year's record. Daily discharges for the period Oct. 1, 1935, to Jan. 14, 1936, were estimated on the basis of records for White Clay Creek near Newark, Delaware, in order that the data for a continous period might be analysed. The mean annual flow-duration data for 24 years were determined, and the maximum and minimum years respectively were found to be 1936 and 1954. For purposes of comparison the 24-year period, the maximum year, and the minimum year were analyzed separately. The results are presented in Table 57 and figure 18. The discharge per square mile was based on a drainage area of 52.6 square miles with a breakdown selected for 34 daily discharges covering the range in flow under all conditions.

TABLE 57

Flow-duration Data for Big Elk Creek at Elk Mills, Cecil County (for the years starting April 1 during 1932–55)

(Drainage area, 52.6 square miles)

Discharge		Number of days or percent of time when discharge equalled or exceeded that shown					
cfs per sq mi	cfs	Minimum year 1954		Maximum year 1935		24-year period 1932–55	
		Sum	Percent	Sum	Percent	Sum	Percent
0.13	7.0	—	—	—	—	8766	100.00
.14	7.4	365	100.00	—	—	8764	99.98
.15	7.9	364	99.73	—	—	8760	99.93
.17	8.9	363	99.45	—	—	8750	99.82
.20	10.5	361	98.90	—	—	8730	99.59
.23	12.1	351	96.16	—	—	8668	98.88
.27	14.2	329	90.14	—	—	8535	97.36
.31	16.3	278	76.16	—	—	8362	95.39
.35	18.4	252	69.04	—	—	8187	93.39
.40	21.0	225	61.64	—	—	8009	91.36
.45	23.7	188	51.51	—	—	7694	87.77
.50	26.3	167	45.75	366	100.00	7298	83.25
.60	31.6	144	39.45	362	98.91	6636	75.70
.70	36.8	123	33.70	344	93.99	5818	66.37
.80	42.1	102	27.95	295	80.60	5016	57.22
.90	47.3	77	21.10	257	70.22	4332	49.42
1.00	52.6	55	15.07	226	61.75	3731	42.56
1.15	60.5	41	11.23	195	53.28	2987	34.07
1.30	68.4	26	7.12	165	45.08	2390	27.26
1.50	78.9	19	5.21	135	36.89	1831	20.89
1.70	89.4	16	4.38	125	34.15	1418	16.18
2.00	105	12	3.29	101	27.60	1027	11.72
2.40	126	10	2.74	65	17.76	717	8.18
2.90	153	7	1.92	47	12.84	516	5.89
3.50	184	4	1.10	43	11.75	397	4.53
4.20	221	4	1.10	34	9.29	320	3.65
5.00	263	4	1.10	31	8.47	248	2.83
6.00	316	2	.55	25	6.83	185	2.11
8.00	421	1	.27	17	4.64	125	1.43
12.0	631	—	—	8	2.19	68	.78
18.0	947	—	—	6	1.64	31	.35
24.0	1,262	—	—	4	1.09	17	.19
29.0	1,525	—	—	1	.27	8	.09
38.0	2,000	—	—	1	.27	2	.02

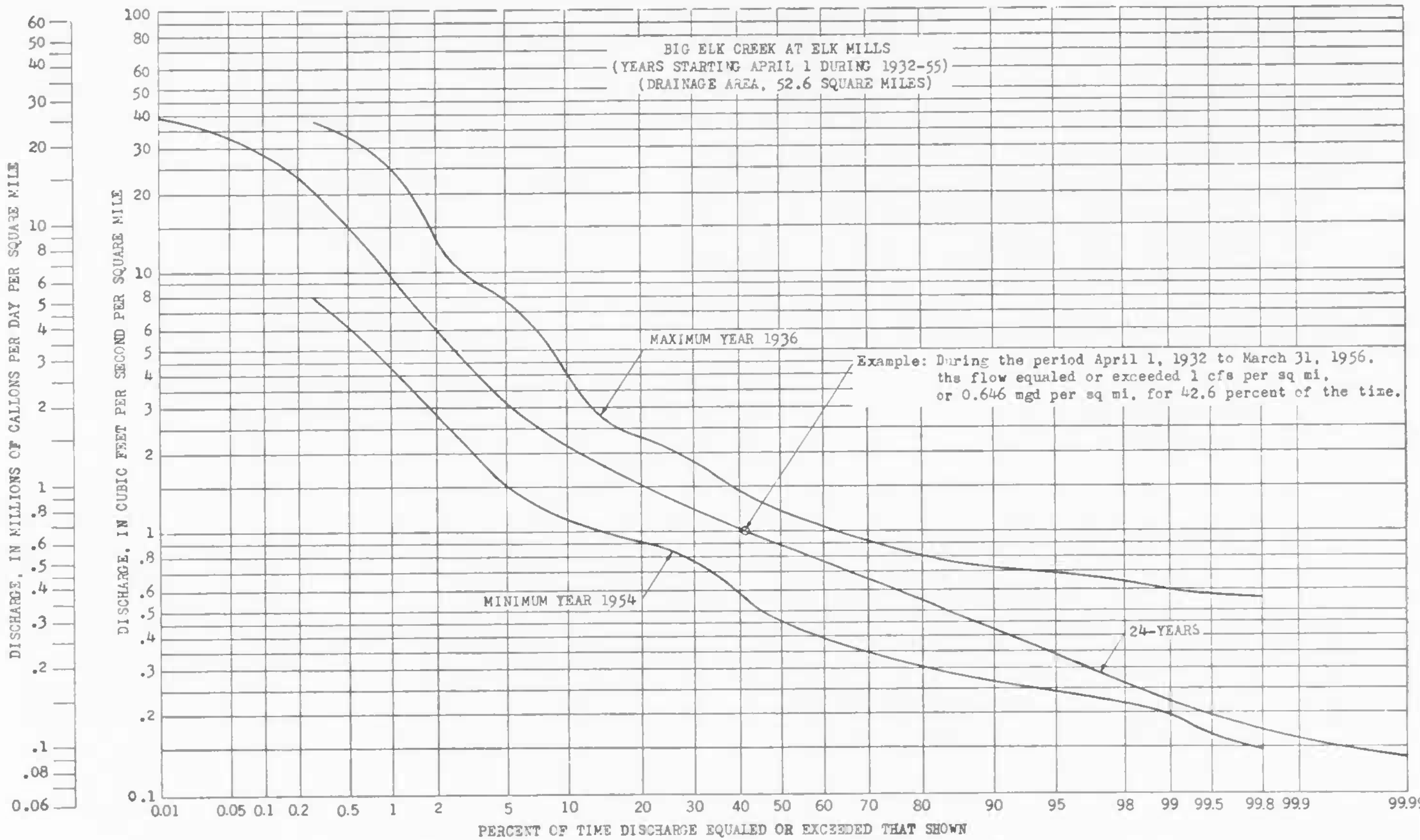

FIGURE 18. Flow-duration Curves for Big Elk Creek at Elk Mills, Cecil County

TABLE 58

Chemical Constituents and Related Physical Measurements of the Surface Waters of Kent and Queen Annes Counties, June 30, 1952, to March 26, 1953

Chemical analyses in parts per million

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue on evaporation at 180°C)	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25°C)	pH	Color	Temperature (°F)
Chester River at Chestertown																			
Oct. 27, 1952	—	4.9	0.16	49	211	1,660	84	54	458	2,960	0.0	1.0	5,790	990	946	9,140	7.1	—	56
Oct. 29, 1952	—	—	—	—	—	1,420		50	716	2,250	—	.8	—	880	839	7,620	7.0	—	50
Chester River at Crumpton																			
June 30, 1952	—	—	—	—	—	67		34	22	111	—	1.8	—	64	36	461	7.0	—	—
Oct. 27, 1952	—	6.6	.09	17	26	198	14	37	78	360	.3	.8	764	150	119	1,380	6.9	—	55
Oct. 29, 1952	—	—	—	—	—	152		35	62	250	—	1.1	—	116	88	1,020	6.9	—	53
Chester River at Millington																			
June 30, 1952	—	—	—	—	—	4.5		27	8.0	2.8	—	1.8	—	26	4	80.7	6.8	—	—
Oct. 27, 1952	—	16	.45	9.2	3.5	4.9	2.5	30	20	6.2	.0	1.2	71	37	13	97.7	7.1	—	54
Morgan Creek near Kennedyville																			
June 30, 1952	9.6	12	1.0	11	1.4	3.8	2.5	37	4.5	6.0	.2	2.0	74	33	3	90.0	7.1	40	—
Oct. 29, 1952	—	—	—	—	—	10		42	15	4.2	—	1.1	—	34	0	98.2	7.0	—	45
Morgan Creek near Chestertown																			
Oct. 27, 1952	—	7.6	.01	32	61	514	22	42	158	930	—	1.2	1,840	331	296	3,180	6.7	12	54

Red Lion Branch near Crumpton																			
Oct. 27, 1952	—	—	—	—	—	6.0		19	4.8	5.2	—	2.8	—	17	1	103	6.9	—	54
Unicorn Branch near Millington																			
June 30, 1952	17	13	.01	4.0	1.7	3.5	1.0	16	1.0	5.9	.0	3.3	60	17	4	66.1	6.6	12	77
Oct. 27, 1952	—	—	—	—	—	7.1		16	8.8	5.2	—	4.7	—	18	5	69.7	7.0	—	56
Southeast Creek near Church Hill																			
June 30, 1952	9.6	16	.16	14	2.2	4.8	3.1	38	12	8.0	.1	2.7	103	44	8	124	6.8	25	68
Jacob's Creek near Sassafras																			
June 30, 1952	6.0	13	.81	7.5	1.8	4.2	2.0	24	3.8	6.1	.2	5.2	74	26	6	81.7	7.1	30	—
Tuckahoe Creek near Ruthsburg																			
June 30, 1952	53	16	.58	9.2	1.2	4.6	2.0	29	8.0	5.9	.4	2.6	83	28	4	88.1	7.0	55	68
Sept. 19, 1952	—	—	—	—	—	8.1		30	10	6.0	—	2.6	—	28	3	90.1	6.8	—	—
Sallie Harris Creek near Carmichael																			
July 1, 1952	4.3	18	.76	17	1.0	4.5	1.7	46	13	4.0	.2	2.5	103	46	9	120	7.3	52	61
Chesapeake Bay at East end of Bay Bridge																			
Oct. 29, 1952	—	5.0	.07	72	268	1,800	104	53	484	3,450	—	3.0	6,210	1,280	1,240	11,100	7.5	—	—
Wye River near Carmichael																			
Mar. 26, 1953	—	5.9	.01	76	268	2,170	96	60	565	3,950	—	1.2	7,160	1,290	1,240	11,700	7.4	18	—
Wye River near Queenstown																			
Mar. 26, 1953	—	7.8	.47	8.3	2.2	3.8	2.5	18	19	5.8	—	1.4	98	30	15	138	6.9	170	—

CHEMICAL QUALITY OF SURFACE WATER

No data are available on chemical quality of the surface water of Cecil County. The data on chemical quality of the surface waters of Kent and Queen Annes Counties are principally from a report on "Salinity Studies on Estuaries of the Eastern Shore of Maryland," by J. J. Murphy (1957), and are supplemented by other U. S. Geological Survey analyses. The data were primarily obtained in a reconnaissance study of chloride intrusion from the Chesapeake Bay. The degree of salt-water intrusion is affected by such factors as tide stages, discharge rates at the sampling sites, and precipitation. For a 23-mile stretch of the Chester River from the Bay to the sampling site at Crumpton definite saline penetration occurs. At Millington, which is 27 miles upstream, there is no indication of saline penetration. Samples collected at time of high tide from tributaries upstream from Crumpton show no evidence of saline penetration. Samples collected at the tidal and non-tidal reaches of the Wye River show definite salt intrusion for the tidal reaches.

Chemical constituents and related physical measurements of samples of surface waters of Kent and Queen Annes Counties, covering the period June 30, 1952, to March 26, 1953, are shown in Table 58.

The chemical quality-of-water of the non-tidal reaches of the rivers and streams is satisfactory for most uses. These waters are relatively low in dissolved solids content and hardness. Salt intrusion of the tidal reaches of the waters, especially at times of high tide, limits their use for domestic purposes during these periods. The specifications for physical and chemical requirements for potable waters, established by the Drinking Water Standards Committee of the U. S. Public Health Service (1946), lists, among other tolerances, a non-mandatory but recommended limit of 250 ppm chloride and 1,000 ppm total solids (500 ppm preferred). The data in Table 58 demonstrate that some of these limits are exceeded at times.

No general statement will suffice as to the industrial utility of the surface waters of Kent and Queen Annes Counties. Quality requirements of water for each specific industry vary widely and, therefore, require more adequate data than are available for appraisal. In addition to the types and quantities of constituents, an important consideration is whether or not the concentrations of the various chemical constituents remain relatively constant. Such publications as the California State Water Pollution Control Board, Publication No. 3, entitled "Water Quality Criteria", 1952 p. 127–147, give a comprehensive listing of water quality requirements of industry.

Many hydrologic, geologic, and topographic factors are involved in the final determination of the suitability of these waters for irrigation. Handbook 60 of U. S. Department of Agriculture cites criteria for evaluation of suitability of water for irrigation.

DISCHARGE RECORDS

Monthly discharge records prior to October 1943 for gaging stations in Maryland are published in Bulletin 1, Department of Geology, Mines and Water Resources, State of Maryland. Later records for this tricounty area are contained in the following pages. Monthly discharge figures prior to October 1943 for Octoraro Creek near Rising Sun and at Rowlandsville, and for Big Elk Creek at Elk Mills, are republished either because of a drainage area revision, which necessitated revision of the previously published unit runoff figures, or because a recent area-wide review and compilation disclosed errors in the data. Pertinent details are given in the descriptions for each station. Gaging stations are listed in downstream order in Table 55 and are plotted on the map in figure 17.

1. Christina River at Coochs Bridge, Del.

Location.—Lat. 39°38′16″, long. 75°43′46″, on left bank at downstream side of highway bridge 0.3 mile south of Coochs Bridge, New Castle County, 3.3 miles upstream from Muddy Run, and 3.5 miles south of Newark.

Drainage area.—20.5 square miles.

Records available.—April 1943 to September 1956.

Gage.—Water-stage recorder and concrete control. Datum of gage is 25.6 feet above mean sea level, datum of 1929. Prior to Sept. 14, 1944, wire-weight gage on upstream side of bridge at same datum.

Average discharge.—13 years, 25.8 second-feet.

Extremes.—Maximum discharge, 2,620 second-feet May 1, 1947 (gage height, 12.41 feet); minimum daily, 0.4 second-feet July 26, 1944, August 1, 1954.

Remarks.—Low and medium flow regulated by mill above station.

Monthly discharge of Christina River at Coochs Bridge

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1943						
April	457	12	37.5	1.83	2.04	1.18
May	810	10	63.6	3.10	3.58	2.00
June	114	7.6	25.9	1.26	1.41	.814
July	229	4.8	23.7	1.16	1.33	.750
August	16	1.8	7.71	.376	.43	.243
September	14	.9	5.93	.289	.32	.187
The year						
1943–44						
October	55	3.2	13.0	0.634	0.73	0.410
November	368	5.9	33.9	1.65	1.84	1.07
December	204	2.8	18.4	.898	1.04	.580
January	372	4.8	49.1	2.40	2.76	1.55
February	79	6.0	19.0	.927	1.00	.599
March	545	7.6	66.8	3.26	3.76	2.11
April	476	6.6	45.0	2.20	2.45	1.42
May	33	5.0	14.5	.707	.81	.457
June	34	3.6	11.6	.566	.63	.366
July	13	.4	5.48	.267	.31	.173
August	55	1.6	8.25	.402	.46	.260
September	73	1.0	8.69	.424	.47	.274
The year	545	.4	24.5	1.20	16.26	.776

DELAWARE RIVER BASIN—*Continued*

Monthly discharge of Christina River at Coochs Bridge—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1944–45						
October	13	1.8	5.75	0.280	0.32	0.181
November	146	2.2	17.5	.854	.95	.552
December	375	7.7	26.8	1.31	1.50	.847
January	392	9.6	35.3	1.72	1.99	1.11
February	290	8.7	56.6	2.76	2.87	1.78
March	82	12	23.6	1.15	1.33	.743
April	171	7.7	24.0	1.17	1.31	.756
May	86	7.5	22.8	1.11	1.28	.717
June	62	5.2	11.7	.571	.64	.369
July	580	7.0	73.2	3.57	4.12	2.31
August	796	12	58.8	2.87	3.31	1.85
September	414	9.5	31.6	1.54	1.72	.995
The year	796	1.8	32.2	1.57	21.34	1.01
1945–46						
October	20	7.0	11.8	0.576	0.66	0.372
November	147	8.0	27.2	1.33	1.48	.860
December	452	13	54.2	2.64	3.05	1.71
January	68	15	27.1	1.32	1.52	.853
February	121	16	29.6	1.44	1.51	.931
March	76	17	26.4	1.29	1.48	.834
April	42	10	17.3	.844	.94	.545
May	278	7.6	39.6	1.93	2.23	1.25
June	623	8.8	39.5	1.93	2.15	1.25
July	556	5.1	32.5	1.59	1.83	1.03
August	27	5.4	10.0	.488	.56	.315
September	31	2.4	7.77	.379	.42	.245
The year	623	2.4	26.9	1.31	17.83	.847
1946–47						
October	14	2.6	7.16	0.349	0.40	0.226
November	14	4.4	7.07	.345	.38	.223
December	88	3.6	10.6	.517	.60	.334
January	154	5.7	22.6	1.10	1.27	.711
February	12	4.2	10.1	.493	.51	.319
March	131	9.7	24.5	1.20	1.38	.776
April	192	12	25.5	1.24	1.39	.801
May	874	12	69.9	3.41	3.93	2.20
June	34	8.0	14.5	.707	.79	.457
July	145	4.2	17.6	.859	.99	.555
August	10	3.2	6.01	.293	.34	.189
September	40	5.0	7.63	.372	.42	.240
The year	874	2.6	18.7	.912	12.40	.589

Monthly discharge of Christina River at Coochs Bridge—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1947–48						
October	33	3.9	5.50	0.268	0.31	0.173
November	302	2.2	37.2	1.81	2.03	1.17
December	111	9.4	17.1	.834	.96	.539
January	446	8.2	48.4	2.36	2.72	1.53
February	431	8.1	60.3	2.94	3.17	1.90
March	119	18	39.8	1.94	2.24	1.25
April	405	16	39.6	1.93	2.16	1.25
May	399	15	56.4	2.75	3.17	1.78
June	369	12	32.3	1.58	1.76	1.02
July	37	4.2	11.3	.551	.64	.356
August	26	3.5	9.84	.480	.55	.310
September	15	2.7	6.67	.325	.36	.210
The year	446	2.2	30.2	1.47	20.07	.950
1948–49						
October	18	1.4	5.76	0.281	0.32	0.182
November	100	2.7	11.9	.580	.65	.375
December	500	7.5	41.8	2.04	2.35	1.32
January	250	12	48.6	2.37	2.73	1.53
February	163	25	56.8	2.77	2.88	1.79
March	268	13	33.8	1.65	1.90	1.07
April	87	12	24.4	1.19	1.33	.769
May	124	13	27.4	1.34	1.54	.866
June	21	8.2	14.4	.702	.78	.454
July	183	7.9	24.0	1.17	1.35	.756
August	65	2.6	9.92	.484	.56	3.13
September	14	1.5	6.75	.329	.37	.213
The year	500	1.4	25.3	1.23	16.76	.795
1949–50						
October	61	1.6	8.76	0.427	0.49	0.276
November	14	4.0	7.74	.378	.42	.244
December	93	4.8	16.4	.800	.92	.517
January	67	7.0	12.0	.585	.67	.378
February	191	11	38.0	1.85	1.93	1.20
March	459	10	48.1	2.35	2.70	1.52
April	57	11	16.1	.785	.87	.507
May	58	10	18.7	.912	1.05	.589
June	64	5.2	12.5	.610	.68	.394
July	37	.8	8.51	.415	.48	.268
August	51	1.8	7.36	.359	.41	.232
September	70	7.8	14.6	.712	.80	.460
The year	459	.8	17.3	.844	11.42	.545

Monthly discharge of Christina River at Coochs Bridge—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1950–51						
October	92	6.6	12.5	0.610	0.70	0.394
November	500	7.0	37.8	1.84	2.06	1.19
December	119	9.7	21.6	1.05	1.22	.679
January	290	10	29.3	1.43	1.65	.924
February	311	17	63.5	3.10	3.23	2.00
March	407	14	43.6	2.13	2.45	1.38
April	177	17	29.6	1.44	1.61	.931
May	142	9.2	22.5	1.10	1.26	.711
June	81	10	18.3	.893	1.00	.577
July	353	5.7	27.0	1.32	1.52	.853
August	30	2.2	8.33	.406	.47	.262
September	11	1.0	5.56	.271	.30	.175
The year	500	1.0	26.4	1.29	17.47	.834
1951–52						
October	23	1.5	7.91	0.386	0.44	0.249
November	305	6.1	36.2	1.77	1.97	1.14
December	740	8.6	52.5	2.56	2.95	1.65
January	203	20	51.7	2.52	2.91	1.63
February	564	20	44.2	2.16	2.33	1.40
March	532	22	64.0	3.12	3.60	2.02
April	316	20	58.1	2.83	3.16	1.83
May	487	18	49.5	2.41	2.78	1.56
June	325	14	32.4	1.58	1.77	1.02
July	659	8.2	36.0	1.76	2.02	1.14
August	101	7.8	16.9	.824	.95	.533
September	200	6.2	18.7	.912	1.02	.589
The year	740	1.5	39.0	1.90	25.90	1.23
1952–53						
October	11	5.2	7.54	0.368	0.42	0.238
November	471	4.4	31.9	1.56	1.74	1.01
December	486	10	40.9	2.00	2.30	1.29
January	629	18	73.8	3.60	4.15	2.33
February	270	20	43.4	2.12	2.21	1.37
March	304	18	69.5	3.39	3.91	2.19
April	233	22	50.7	2.47	2.76	1.60
May	188	14	41.7	2.03	2.34	1.31
June	135	7.9	22.0	1.07	1.20	.692
July	82	5.0	9.64	.470	.54	.304
August	17	3.5	6.07	.296	.34	.191
September	28	1.4	6.06	.296	.33	.191
The year	629	1.4	33.6	1.64	22.24	1.06

Monthly discharge of Christina River at Coochs Bridge—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1953–54						
October	187	1.4	11.2	0.546	0.63	0.353
November	58	4.6	18.4	.898	1.00	.580
December	421	8.1	38.3	1.87	2.15	1.21
January	122	8.4	19.3	.941	1.09	.608
February	39	7.0	14.0	.683	.71	.441
March	182	16	39.0	1.90	2.19	1.23
April	84	12	22.6	1.10	1.23	.711
May	108	7.0	16.3	.795	.91	.514
June	9.5	1.6	6.13	.299	.33	.193
July	11	.9	3.65	.178	.20	.115
August	11	.4	4.31	.210	.24	.136
September	13	.5	3.47	.169	.19	.109
The year	421	.4	16.5	.805	10.87	.520
1954–55						
October	31	.5	4.33	0.211	0.24	0.136
November	105	.6	11.3	.551	.61	.356
December	120	2.8	16.1	.785	.91	.507
January	19	3.3	8.72	.425	.49	.275
February	455	4.0	34.0	1.66	1.73	1.07
March	349	12	41.7	2.03	2.35	1.31
April	48	8.2	18.3	.893	1.00	.577
May	14	2.6	8.38	.409	.47	.264
June	92	1.9	19.4	.946	1.06	.611
July	7.7	1.1	3.75	.183	.21	.118
August	800	1.7	89.7	4.38	5.04	2.83
September	15	5.8	9.74	.475	.53	.307
The year	800	.5	22.1	1.08	14.64	.698
1955–56						
October	152	5.2	15.8	0.771	0.89	0.498
November	38	7.1	11.6	.566	.63	.366
December	12	4.7	7.43	.362	.42	.234
January	167	3.1	15.7	.766	.89	.495
February	309	14	49.4	2.41	2.60	1.56
March	594	12	54.4	2.65	3.06	1.71
April	173	14	28.6	1.40	1.55	.905
May	42	7.5	12.9	.629	.73	.407
June	52	5.6	14.0	.683	.76	.441
July	630	4.5	38.2	1.86	2.15	1.20
August	159	4.7	14.5	.707	.82	.457
September	20	3.4	7.39	.360	.40	.233
The year	630	3.1	22.4	1.09	14.90	.704

DELAWARE RIVER BASIN—*Continued*

Yearly discharge of Christina River at Coochs Bridge

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1944	24.5	1.20	16.26	0.776	23.3	1.14	15.42	0.737
1945	32.2	1.57	21.34	1.01	35.9	1.75	23.76	1.13
1946	26.9	1.31	17.83	.847	21.2	1.03	14.02	.666
1947	18.7	.912	12.40	.589	21.6	1.05	14.32	.679
1948	30.2	1.47	20.07	.950	30.3	1.48	20.09	.957
1949	25.3	1.23	16.76	.795	23.1	1.13	15.27	.730
1950	17.3	.844	11.42	.545	20.5	1.00	13.57	.646
1951	26.4	1.29	17.47	.834	28.5	1.39	18.85	.898
1952	39.0	1.90	25.90	1.23	37.6	1.83	25.00	1.18
1953	33.6	1.64	22.24	1.06	32.6	1.59	21.56	1.03
1954	16.5	.805	10.87	.520	13.4	.654	8.85	.423
1955	22.1	1.08	14.64	.698	22.4	1.09	14.82	.704
1956	22.4	1.09	14.90	.704	—	—	—	—
Highest	39.0	1.90	25.90	1.23	37.6	1.83	25.00	1.18
Average	25.8	1.26	17.08	.814	25.9	1.26	17.13	.814
Lowest	16.5	.805	10.87	.520	13.4	.654	8.85	.423

WYE RIVER BASIN

2. Sallie Harris Creek near Carmichael

Location.—Lat. 38°57′55″, long. 76°06′30″, on left bank 30 feet upstream from bridge on U. S. Highway 50, 2 miles northeast of Carmichael, Queen Annes County, 2.2 miles northwest of Wye Mills, and 2.4 miles upstream from mouth.

Drainage area.—8.09 square miles.

Records available.—June 1951 to September 1956 (discontinued).

Gage.—Water-stage recorder.

Average discharge.—5 years, 8.22 second-feet.

Extremes.—Maximum discharge, 1,030 second-feet Aug. 13, 1955 (gage height, 7.02 feet), from rating curve extended above 370 second-feet by logarithmic plotting; minimum, 1.3 second-feet Sept. 29, 1954.

Monthly discharge of Sallie Harris Creek near Carmichael

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1951						
June 26–30	3.8	2.5	3.10	0.383	0.07	0.248
July	5.7	1.9	2.62	.324	.37	.209
August	9.0	1.7	2.42	.299	.35	.193
September	16	1.7	2.44	.302	.34	.195
The year						
1951–52						
October	3.6	2.1	2.80	0.346	0.40	0.224
November	30	3.1	6.89	.852	.95	.551
December	202	2.7	16.7	2.06	2.38	1.33
January	72	5.4	14.5	1.79	2.06	1.16
February	99	6.0	11.4	1.41	1.52	.911
March	90	6.6	16.1	1.99	2.30	1.29
April	264	6.0	29.8	3.68	4.10	2.38
May	117	4.7	11.8	1.46	1.68	.944
June	28	2.8	7.06	.873	.97	.564
July	23	2.1	4.08	.504	.58	.326
August	134	2.2	10.4	1.29	1.49	.834
September	190	2.5	13.0	1.61	1.79	1.04
The year	264	2.1	12.0	1.48	20.22	.957

Monthly Discharge of Sallie Harris Creek near Carmichael—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October	7.4	2.9	3.44	0.425	0.49	0.275
November	92	3.0	10.0	1.24	1.38	.801
December	101	4.1	11.4	1.41	1.63	.911
January	57	7.1	17.2	2.13	2.44	1.38
February	58	7.0	15.7	1.94	2.02	1.25
March	82	7.9	20.3	2.51	2.89	1.62
April	52	6.1	15.1	1.87	2.08	1.21
May	45	5.1	12.2	1.51	1.74	.976
June	33	3.5	7.16	.885	.99	.572
July	44	3.0	6.37	.787	.91	.509
August	113	2.4	7.30	.902	1.04	.583
September	6.0	2.1	2.63	.325	.36	.210
The year	113	2.1	10.7	1.32	17.97	.853
1953–54						
October	39	2.2	4.84	0.598	0.69	0.386
November	13	3.2	6.46	.799	.89	.516
December	77	3.6	10.0	1.24	1.43	.801
January	35	3.9	10.5	1.30	1.50	.840
February	20	5.0	6.84	.845	.88	.546
March	43	6.7	13.1	1.62	1.87	1.05
April	34	5.6	9.31	1.15	1.28	.743
May	66	3.2	7.79	.963	1.11	.622
June	22	2.5	4.05	.501	.56	.324
July	17	1.8	2.96	.366	.42	.237
August	9.3	1.8	2.46	.304	.35	.196
September	4.3	1.6	2.03	.251	.28	.162
The year	77	1.6	6.71	.829	11.26	.536
1954–55						
October	7.1	1.7	2.15	0.266	0.31	0.172
November	12	2.4	4.55	.562	.63	.363
December	33	2.8	5.90	.729	.84	.471
January	5.9	2.8	3.65	.451	.52	.291
February	25	2.9	6.70	.828	.86	.535
March	31	4.3	8.08	.999	1.15	.646
April	11	3.7	5.03	.622	.69	.402
May	3.9	2.1	2.68	.331	.38	.214
June	28	1.8	4.99	.617	.69	.399
July	8.3	1.6	2.33	.288	.33	.186
August	428	1.5	24.3	3.00	3.46	1.94
September	18	2.2	3.05	.377	.42	.244
The year	428	1.5	6.13	.758	10.28	.490

WYE RIVER BASIN—*Continued*

Monthly Discharge of Sallie Harris Creek near Carmichael—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1955–56						
October	30	2.4	4.86	0.601	0.69	0.388
November	30	3.1	6.78	.838	.93	.542
December	6.8	3.0	3.66	.452	.52	.292
January	24	3.0	5.28	.653	.75	.422
February	53	3.7	11.6	1.43	1.54	.924
March	50	4.0	12.0	1.48	1.71	.957
April	31	4.0	7.05	.871	.97	.563
May	11	2.8	4.02	.497	.57	.321
June	11	1.8	2.67	.330	.37	.213
July	38	1.7	3.91	.483	.56	.312
August	9.5	1.9	2.40	.297	.34	.192
September	11	1.7	2.53	.313	.35	.202
The year	53	1.7	5.54	.685	9.30	.443

Yearly discharge of Sallie Harris Creek near Carmichael, Md.

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1952	12.0	1.48	20.22	0.957	11.9	1.47	19.99	0.950
1953	10.7	1.32	17.97	.853	10.4	1.29	17.48	.834
1954	6.71	.829	11.26	.536	5.98	.739	10.03	.478
1955	6.13	.758	10.28	.490	6.35	.785	10.64	.507
1956	5.54	.685	9.30	.443	—	—	—	—
Highest	12.0	1.48	20.22	.957	11.9	1.47	19.99	.950
Average	8.22	1.02	13.81	.659	8.66	1.07	14.54	.692
Lowest	5.54	.685	9.30	.443	5.98	.739	10.03	.478

CHESTER RIVER BASIN

3. Mills Branch near Millington

Location.—Lat. 39°16′34″, long. 75°52′10″, on upstream side of highway bridge 1.6 miles upstream from mouth and 2.1 miles northwest of Millington, Kent County.

Drainage area.—9.98 square miles.

Records available.—October 1952 to September 1953 (discontinued).

Gage.—Staff gage; read intermittently.

Remarks.—Partial-record station with monthly discharge only; records based on 23 discharge measurements from Oct. 9, 1952, to Oct. 6, 1953. Standard error of estimate of monthly discharge about 16 percent.

Monthly discharge of Mills Branch near Millington

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October			2.34	0.234	0.27	0.151
November			7.98	.800	.89	.517
December			10.4	1.04	1.20	.672
January			19.5	1.95	2.25	1.26
February			14.1	1.41	1.47	.911
March			20.9	2.09	2.41	1.35
April			24.2	2.42	2.70	1.56
May			7.83	.785	.90	.507
June			7.45	.746	.83	.482
July			2.74	.275	.32	.178
August			1.97	.197	.23	.127
September			1.52	.152	.17	.098
The year			10.0	1.00	13.64	.646

CHESTER RIVER BASIN

4. Unicorn Branch near Millington

Location.—Lat. 39°15′00″, long. 75°51′40″, on right bank 50 feet upstream from bridge on State Highway 313, 0.9 mile upstream from mouth, and 1.4 miles southwest of Millington, Kent County.

Drainage area.—22.3 square miles.

Records available.—January 1948 to September 1956.

Gage.—Water-stage recorder and concrete control.

Average discharge.—8 years, 22.6 second-feet.

Extremes.—Maximum discharge, 383 second-feet Apr. 28, 1952 (gage height, 4.41 feet); minimum, 1.3 second-feet Sept. 15, 1949 (gage height, 1.70 feet); minimum daily 4.8 second-feet Aug. 6, 1955.

Remarks.—Occasional regulation at low flow by fish hatchery above station.

Monthly discharge of Unicorn Branch near Millington

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1948						
January	201	8.9	38.6	1.73	1.99	1.12
February	300	16	55.3	2.48	2.68	1.60
March	95	24	42.7	1.91	2.21	1.23
April	134	19	34.8	1.56	1.74	1.01
May	150	19	52.9	2.37	2.74	1.53
June	58	15	26.6	1.19	1.33	.769
July	54	11	15.5	.695	.80	.449
August	60	9.9	19.3	.865	1.00	.559
September	13	8.8	10.1	.453	.51	.293
The year						
1948–49						
October	16	9.9	10.5	0.471	0.54	0.304
November	88	9.9	16.8	.753	.84	.487
December	233	22	55.6	2.49	2.88	1.61
January	152	30	68.2	3.06	3.53	1.98
February	131	34	66.3	2.97	3.10	1.92
March	100	29	48.7	2.18	2.52	1.41
April	60	21	33.3	1.49	1.67	.963
May	132	16	32.2	1.44	1.66	.931
June	16	6.9	9.20	.413	.46	.267
July	13	5.4	8.60	.386	.44	.249
August	35	8.8	12.1	.543	.63	.351
September	22	6.4	10.2	.457	.51	.295
The year	233	5.4	30.8	1.38	18.78	.892

Monthly Discharge of Unicorn Branch Near Millington—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1949–50						
October	26	7.3	8.94	0.401	0.46	0.259
November	24	8.8	10.7	.480	.53	.310
December	21	9.3	11.0	.493	.57	.319
January	20	7.8	11.0	.493	.57	.319
February	53	14	23.4	1.05	1.09	.679
March	144	14	33.4	1.50	1.72	.969
April	31	16	19.8	.888	.99	.574
May	49	15	23.6	1.06	1.22	.685
June	66	8.8	19.4	.870	.97	.562
July	92	8.8	18.6	.834	.96	.539
August	14	7.8	9.45	.424	.49	.274
September	143	8.3	22.1	.991	1.10	.640
The year	144	7.3	17.6	.789	10.67	.510
1950–51						
October	38	9.9	13.1	0.587	0.67	0.379
November	102	8.3	18.4	.825	.92	.533
December	29	12	18.7	.839	.97	.542
January	44	15	22.5	1.01	1.16	.653
February	125	21	39.6	1.78	1.85	1.15
March	56	16	27.0	1.21	1.40	.782
April	86	14	29.4	1.32	1.47	.853
May	140	10	29.5	1.32	1.53	.853
June	103	8.7	21.8	.978	1.09	.632
July	184	7.3	19.5	.874	1.01	.565
August	13	6.9	9.22	.413	.48	.267
September	34	5.7	8.75	.392	.44	.253
The year	184	5.7	21.3	.955	12.99	.617
1951–52						
October	19	6.1	8.25	0.370	0.43	0.239
November	56	9.3	22.8	1.02	1.14	.659
December	248	10	44.5	2.00	2.30	1.29
January	149	31	47.9	2.15	2.48	1.39
February	157	25	44.0	1.97	2.13	1.27
March	136	27	51.6	2.31	2.67	1.49
April	332	26	67.8	3.04	3.39	1.96
May	145	21	34.4	1.54	1.78	.995
June	145	13	26.3	1.18	1.31	.763
July	190	12	28.1	1.26	1.45	.814
August	82	12	22.9	1.03	1.18	.666
September	104	13	20.8	.933	1.04	.603
The year	332	6.1	34.9	1.57	21.30	1.01

CHESTER RIVER BASIN—*Continued*

Monthly Discharge of Unicorn Branch Near Millington—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October	15	9.9	11.7	0.525	0.60	0.339
November	136	8.8	21.2	.951	1.06	.615
December	120	19	31.6	1.42	1.63	.918
January	159	27	47.1	2.11	2.43	1.36
February	160	28	42.5	1.91	1.99	1.23
March	175	28	57.5	2.58	2.97	1.67
April	128	27	45.4	2.04	2.27	1.32
May	110	24	35.8	1.61	1.85	1.04
June	174	16	31.5	1.41	1.57	.911
July	55	12	15.6	.700	.81	.452
August	24	10	13.5	.605	.70	.391
September	10	8.4	9.41	.422	.47	.273
The year	175	8.4	30.2	1.35	18.35	.873
1953–54						
October	70	7.8	12.3	0.552	0.64	0.357
November	17	10	13.5	.605	.68	.391
December	90	11	22.6	1.01	1.17	.653
January	54	15	25.7	1.15	1.33	.743
February	43	17	22.7	1.02	1.06	.659
March	80	22	33.0	1.48	1.70	.957
April	45	17	23.7	1.06	1.19	.685
May	79	11	20.5	.919	1.06	.594
June	19	7.4	9.43	.423	.47	.273
July	9.7	6.3	7.47	.335	.39	.217
August	18	6.3	7.85	.352	.41	.228
September	11	5.1	7.19	.322	.36	.208
The year	90	5.1	17.2	.771	10.46	.498
1954–55						
October	12	5.9	6.86	0.308	0.35	0.199
November	19	7.0	9.49	.426	.47	.275
December	27	7.8	10.5	.471	.54	.304
January	15	7.8	10.4	.466	.54	.301
February	37	7.8	16.4	.735	.77	.475
March	43	16	22.9	1.03	1.18	.666
April	28	12	17.3	.776	.86	.502
May	17	7.4	9.95	.446	.51	.288
June	44	7.0	12.7	.570	.63	.368
July	6.7	5.1	5.65	.253	.29	.164
August	257	4.8	33.4	1.50	1.73	.969
September	26	9.0	12.0	.538	.60	.348
The year	257	4.8	14.0	.628	8.47	.406

CHESTER RIVER BASIN—*Continued*

Monthly discharge of Unicorn Branch Near Millington—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1955-56						
October	16	8.9	11.2	0.502	0.58	0.324
November	15	8.9	10.4	.466	.52	.301
December	10	7.8	8.86	.397	.46	.257
January	19	7.8	10.4	.466	.54	.301
February	44	13	22.6	1.01	1.09	.653
March	143	12	34.0	1.52	1.76	.982
April	72	15	25.4	1.14	1.27	.737
May	22	10	13.8	.619	.72	.400
June	28	7.3	11.0	.493	.55	.319
July	24	6.4	9.47	.425	.49	.275
August	20	6.8	9.35	.419	.48	.271
September	8.4	6.4	6.86	.308	.34	.199
The year	143	6.4	14.4	.646	8.80	.418

Yearly discharge of Unicorn Branch near Millington

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1948	—	—	—	—	31.5	1.41	19.26	0.911
1949	30.8	1.38	18.78	0.892	26.4	1.18	16.08	.763
1950	17.6	.789	10.67	.510	19.2	.861	11.67	.556
1951	21.3	.955	12.99	.617	23.5	1.05	14.30	.679
1952	34.9	1.57	21.30	1.01	34.0	1.52	20.72	.982
1953	30.2	1.35	18.35	.873	28.8	1.29	17.55	.834
1954	17.2	.771	10.46	.498	15.3	.686	9.33	.443
1955	14.0	.628	8.47	.406	14.3	.641	8.67	.414
1956	14.4	.646	8.80	.418	—	—	—	—
Highest	34.9	1.57	21.30	1.01	34.0	1.52	20.72	.982
Average	22.6	1.01	13.73	.653	24.1	1.08	14.70	.698
Lowest	14.0	.628	8.47	.406	14.3	.641	8.67	.414

CHESTER RIVER BASIN

5. Foreman Branch at Ewingville

Location.—Lat. 39°12′39″, long. 75°58′59″, on upstream left abutment of bridge on State Highway 544 0.7 mile north of Ewingville, Queen Annes County, and 1.8 miles west of McGinnes.

Drainage area.—5.27 square miles.

Records available.—October 1952 to September 1953 (discontinued).

Gage.—Staff gage; read intermittently.

Remarks.—Partial-record station with monthly discharge only; records based on 24 discharge measurements from Oct. 8, 1952 to Oct. 5, 1953. Standard error of estimate of monthly discharge about 13 percent.

Monthly discharge of Foreman Branch at Ewingville

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October			2.08	0.395	0.45	0.255
November			4.76	.903	1.01	.584
December			7.32	1.39	1.60	.898
January			9.63	1.83	2.11	1.18
February			8.72	1.65	1.72	1.07
March			14.1	2.68	3.09	1.73
April			12.1	2.30	2.56	1.49
May			6.11	1.16	1.34	.750
June			4.56	.865	.97	.559
July			3.63	.689	.79	.445
August			2.43	.461	.53	.298
September			1.53	.290	.32	.187
The year			6.41	1.22	16.49	.789

CHESTER RIVER BASIN

6. Morgan Creek near Kennedyville

Location.—Lat. 39°16′50″, long. 76°00′55″, on right bank 200 feet upstream from highway bridge, 2 miles southwest of Kennedyville, Kent County, and 4½ miles upstream from mouth.

Drainage area.—10.5 square miles.

Records available.—May 1951 to September 1956.

Gage.—Water-stage recorder and concrete control. Altitude of gage is 15 feet (from topographic map).

Average discharge.—5 years, 9.73 second-feet.

Extremes.—Maximum discharge, 463 second-feet Aug. 13, 1955 (gage height, 6.87 feet) from rating curve extended above 310 second-feet by logarithmic plotting; minimum, 1.8 second-feet July 23, 24, Aug. 6, 1955 (gage height, 1.24 ft).

Monthly discharge of Morgan Creek near Kennedyville

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1951						
June	60	4.5	9.88	0.941	1.05	0.608
July	79	3.6	8.31	.791	.91	.511
August	6.3	3.4	3.98	.379	.44	.245
September	8.5	3.4	3.86	.368	.41	.238
The year						
1951–52						
October	13	3.4	4.99	0.475	0.55	0.307
November	50	4.0	12.3	1.17	1.30	.756
December	258	3.6	18.7	1.78	2.06	1.15
January	52	6.5	14.0	1.33	1.54	.860
February	159	7.5	15.1	1.44	1.55	.931
March	62	8.0	14.9	1.42	1.64	.918
April	168	7.5	20.3	1.93	2.15	1.25
May	51	7.0	11.7	1.11	1.29	.717
June	23	4.5	7.97	.759	.85	.491
July	156	4.2	14.8	1.41	1.62	.911
August	82	4.5	15.5	1.48	1.70	.957
September	143	5.3	13.3	1.27	1.41	.821
The year	258	3.4	13.6	1.30	17.66	.840

Monthly discharge of Morgan Creek near Kennedyville—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October	8.5	5.3	5.72	0.545	0.63	0.352
November	128	5.3	13.8	1.31	1.46	.847
December	189	6.0	16.4	1.56	1.81	1.01
January	146	8.0	24.8	2.36	2.72	1.53
February	80	8.0	14.6	1.39	1.45	.898
March	152	8.0	24.4	2.32	2.67	1.50
April	42	8.5	15.2	1.45	1.62	.937
May	40	7.5	13.8	1.31	1.51	.847
June	37	5.6	9.49	.904	1.01	.584
July	127	4.8	11.6	1.10	1.27	.711
August	28	5.3	7.53	.717	.83	.463
September	10	5.0	5.81	.553	.62	.357
The year	189	4.8	13.6	1.30	17.60	.840
1953–54						
October	68	4.8	9.82	0.935	1.08	0.604
November	17	6.5	10.3	.981	1.09	.634
December	136	6.0	16.1	1.53	1.77	.989
January	33	5.6	11.0	1.05	1.21	.679
February	15	5.3	8.35	.795	.83	.514
March	44	6.5	12.5	1.19	1.38	.769
April	17	5.3	7.55	.719	.80	.465
May	114	4.0	10.2	.971	1.12	.628
June	9.0	3.2	4.00	.381	.42	.246
July	5.3	3.0	3.49	.332	.38	.215
August	11	3.0	4.02	.383	.44	.248
September	10	3.2	4.30	.410	.46	.265
The year	136	3.0	8.50	.810	10.98	.524
1954–55						
October	30	3.2	5.51	0.525	0.60	0.339
November	22	4.2	6.57	.626	.70	.405
December	17	3.8	6.21	.591	.68	.382
January	6.5	3.0	4.56	.434	.50	.281
February	55	3.5	8.58	.817	.85	.528
March	31	4.5	8.49	.809	.93	.523
April	10	4.0	5.35	.510	.57	.330
May	7.0	2.8	3.77	.359	.41	.232
June	16	2.6	5.85	.557	.62	.360
July	6.0	2.0	2.54	.242	.28	.156
August	299	2.0	18.6	1.77	2.05	1.14
September	15	3.0	4.26	.406	.45	.262
The year	299	2.0	6.69	.637	8.64	.412

CHESTER RIVER BASIN—*Continued*

Monthly discharge of Morgan Creek near Kennedyville—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1955–56						
October	11	3.8	4.78	0.455	0.52	0.294
November	10	3.6	4.65	.443	.49	.286
December	5.3	3.2	4.01	.382	.44	.247
January	11	3.2	4.63	.441	.51	.285
February	34	4.2	8.37	.797	.86	.515
March	54	4.0	10.6	1.01	1.16	.653
April	18	4.8	6.85	.652	.73	.421
May	7.5	3.6	4.70	.448	.52	.290
June	9.7	2.8	3.98	.379	.42	.245
July	145	2.8	11.7	1.11	1.28	.717
August	32	3.0	6.95	.662	.76	.428
September	18	2.4	3.77	.359	.40	.232
The year	145	2.4	6.25	.595	8.09	.395

Yearly discharge of Morgan Creek near Kennedyville

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Run off in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1952	13.6	1.30	17.66	0.840	13.6	1.30	17.65	0.840
1953	13.6	1.30	17.60	.840	13.6	1.30	17.64	.840
1954	8.50	.810	10.98	.524	6.98	.665	9.02	.430
1955	6.69	.637	8.64	.412	6.28	.598	8.11	.386
1956	6.25	.595	8.09	.385	—	—	—	—
Highest	13.6	1.30	17.66	.840	13.6	1.30	17.65	.840
Average	9.73	.927	12.59	.599	10.1	.962	13.10	.622
Lowest	6.25	.595	8.09	.385	6.28	.598	8.11	.386

CHESTER RIVER BASIN

7. Southeast Creek at Church Hill

Location.—Lat. 39°07′57″, long. 75°58′51″, on right bank 10 feet upstream from culvert on private road, 600 feet downstream from small tributary, 0.7 mile south of Church Hill, Queen Annes County, and 5½ miles upstream from mouth.

Drainage area.—12.5 square miles.

Records available.—June 1951 to September 1956 (discontinued).

Gage.—Water-stage recorder.

Average discharge.—5 years, 12.6 second-feet.

Extremes.—Maximum discharge, 990 second-feet Aug. 13, 1955 (gage height, 8.34 feet), from rating curve extended above 66 second-feet on basis of computation of flow through culverts and over road at gage heights 4.80, 6.32, 6.36, 7.19 and 7.91 feet, minimum, 1.3 second-feet July 23, 1955; minimum gage height, 1.26 feet Sept. 20, 21, 23, 24, 1956.

Monthly discharge of Southeast Creek at Church Hill

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1951						
July	67	3.2	7.45	0.596	0.69	0.385
August	5.1	2.9	3.52	.282	.32	.182
September	22	2.1	3.38	.270	.30	.174
The year						
1951–52						
October	7.6	2.0	3.18	0.254	0.29	0.164
November	41	4.0	9.18	.734	.82	.474
December	296	4.5	23.5	1.88	2.16	1.22
January	100	10	25.4	2.03	2.34	1.31
February	217	12	24.6	1.97	2.12	1.27
March	158	14	34.4	2.75	3.17	1.78
April	311	11	40.0	3.20	3.57	2.07
May	262	8.8	24.4	1.95	2.25	1.26
June	120	5.7	12.6	1.01	1.13	.653
July	37	3.7	7.30	.584	.67	.377
August	299	4.2	20.0	1.60	1.84	1.03
September	176	4.0	12.4	.992	1.11	.641
The year	311	2.0	19.7	1.58	21.47	1.02

Chester River Basin—*Continued*

Monthly discharge of Southeast Creek at Church Hill—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October	6.8	4.0	4.79	0.383	0.44	0.248
November	142	4.7	15.0	1.20	1.34	.776
December	194	9.3	19.3	1.54	1.78	.995
January	164	12	30.3	2.42	2.80	1.56
February	145	14	25.6	2.05	2.14	1.32
March	166	13	36.8	2.94	3.39	1.90
April	113	12	28.9	2.31	2.58	1.49
May	42	8.0	17.1	1.37	1.58	.885
June	43	4.9	9.24	.739	.83	.478
July	125	3.5	9.14	.731	.84	.472
August	47	3.4	6.38	.510	.59	.330
September	8.8	2.9	3.53	.282	.32	.182
The year	194	2.9	17.1	1.37	18.63	.885
1953–54						
October	42	2.8	5.08	0.406	0.47	0.262
November	12	4.0	6.64	.531	.59	.343
December	154	4.7	14.6	1.17	1.34	.756
January	44	6.3	14.3	1.14	1.32	.737
February	28	7.5	10.4	.832	.86	.538
March	82	9.6	18.2	1.46	1.68	.944
April	34	7.5	11.9	.952	1.06	.615
May	84	4.5	11.1	.888	1.03	.574
June	9.8	3.4	4.39	.351	.39	.227
July	46	2.0	5.90	.472	.54	.305
August	8.8	1.9	3.03	.242	.28	.156
September	5.9	1.6	2.44	.195	.22	.126
The year	154	1.6	9.02	.722	9.78	.467
1954–55						
October	18	1.9	3.21	0.257	0.30	0.166
November	27	3.2	5.99	.479	.53	.310
December	49	3.2	7.49	.599	.69	.387
January	6.8	3.2	4.76	.381	.44	.246
February	70	3.9	11.9	.952	.99	.615
March	41	6.5	12.4	.992	1.14	.641
April	15	5.7	7.80	.624	.70	.403
May	7.2	3.1	4.13	.330	.38	.213
June	32	2.6	5.76	.461	.51	.298
July	3.3	1.7	2.39	.191	.22	.123
August	510	1.7	30.9	2.47	2.85	1.60
September	48	3.7	6.11	.489	.55	.316
The year	510	1.7	8.56	.685	9.30	.443

CHESTER RIVER BASIN—*Continued*

Monthly discharge of Southeast Creek at Church Hill—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1955–56						
October	24	4.2	6.07	0.486	0.56	0.314
November	24	4.6	6.27	.502	.56	.324
December	7.8	4.0	5.25	.420	.48	.271
January	20	4.0	6.85	.548	.63	.354
February	54	6.0	14.5	1.16	1.25	.750
March	148	7.2	22.0	1.76	2.03	1.14
April	53	8.2	14.5	1.16	1.29	.750
May	19	5.0	7.79	.623	.72	.403
June	25	3.6	6.86	.549	.61	.355
July	33	3.0	4.65	.372	.43	.240
August	50	2.8	5.70	.456	.53	.295
September	4.0	2.0	2.55	.204	.23	.132
The year	148	2.0	8.56	.685	9.32	.443

Yearly discharge of Southeast Creek at Church Hill

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1952	19.7	1.58	21.47	1.02	20.0	1.60	21.76	1.03
1953	17.1	1.37	18.63	.885	16.1	1.29	17.47	.834
1954	9.02	.722	9.78	.467	8.20	.656	8.90	.424
1955	8.56	.685	9.30	.443	8.64	.691	9.38	.447
1956	8.56	.685	9.32	.443	—	—	—	—
Highest	19.7	1.58	21.47	1.02	20.0	1.60	21.76	1.03
Average	12.6	1.01	13.70	.653	13.2	1.06	14.38	.685
Lowest	8.56	.685	9.30	.443	8.20	.656	8.90	.424

CHESTER RIVER BASIN

8. Corsica River at Centreville

Location.—Lat. 39°02′23″, long. 76°04′22″, on upstream side of bridge on U. S. Highway 213 at south limits of Centreville, Queen Annes County.

Drainage area.—11.2 square miles.

Records available.—October 1952 to September 1953 (discontinued).

Gage.—Tape-down point; read intermittently.

Remarks.—Partial-record station with monthly discharge only; records based on 23 discharge measurements from Oct. 13, 1952 to Oct. 5, 1953. Standard error of estimate of monthly discharge about 11 percent.

Monthly discharge of Corsica River at Centreville

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October			6.46	0.577	0.66	0.373
November			14.1	1.26	1.41	.814
December			17.1	1.53	1.76	.989
January			26.3	2.35	2.71	1.52
February			22.8	2.04	2.12	1.32
March			34.2	3.05	3.52	1.97
April			28.5	2.54	2.84	1.64
May			19.9	1.78	2.05	1.15
June			11.6	1.04	1.15	.672
July			10.8	.964	1.11	.623
August			8.34	.745	.86	.482
September			5.35	.478	.53	.309
The year			17.1	1.53	20.72	.989

CHESTER RIVER BASIN

9. Mill Pond Outlet near Langford

Location.—Lat. 39°11′16″, long. 76°06′58″, on left end of spillway at right end of dam on Mill Pond, 1.4 miles east of Langford, Kent County, and 3.0 miles southwest of Chestertown.

Drainage area.—5.10 square miles.

Records available.—October 1952 to September 1953 (discontinued).

Gage.—Staff gage. Auxiliary tape-down point on upstream side of bridge 800 feet downstream from dam at different datum. Gages read intermittently.

Remarks.—Partial-record station with monthly discharge only; records based on 23 discharge measurements from Oct. 13, 1952 to Oct. 6, 1953. Standard error of estimate of monthly discharge about 8 percent.

Monthly discharge of Mill Pond Outlet near Langford

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October			3.84	0.753	0.87	0.487
November			7.24	1.42	1.58	.918
December			7.48	1.47	1.69	.950
January			11.8	2.31	2.67	1.49
February			7.70	1.51	1.57	.976
March			13.4	2.63	3.02	1.70
April			7.46	1.46	1.63	.944
May			8.17	1.60	1.85	1.03
June			5.45	1.07	1.19	.692
July			6.77	1.33	1.53	.860
August			4.40	.863	1.00	.558
September			3.54	.694	.77	.449
The year			7.28	1.43	19.37	.924

Worton Creek Basin

10. Mill Creek at Hanesville

Location.—Lat. 39°17′00″, long. 76°08′05″, on upstream side of highway bridge 0.3 mile northeast of St. James Church and half a mile north of Hanesville, Kent County.

Drainage area.—5.17 square miles.

Records available.—October 1952 to September 1953 (discontinued).

Gage.—Tape-down point. Auxiliary tape-down point on tree on right bank ½ mile downstream from highway bridge and 75 feet above another highway bridge at different datum. Gages read intermittently.

Remarks.—Partial-record station with monthly discharge only; records based on 24 discharge measurements from Oct. 13, 1952 to Oct. 5, 1953. Standard error of estimate of monthly discharge about 23 percent.

Monthly discharge of Mill Creek at Hanesville

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October			2.07	0.400	0.46	0.259
November			4.69	.907	1.01	.586
December			5.47	1.06	1.22	.685
January			8.02	1.55	1.79	1.00
February			6.38	1.23	1.28	.795
March			10.2	1.97	2.28	1.27
April			7.92	1.53	1.71	.989
May			5.28	1.02	1.18	.659
June			3.19	.617	.69	.399
July			2.80	.542	.63	.350
August			2.05	.397	.46	.257
September			1.43	.277	.31	.179
The year			4.96	.959	13.02	.620

SASSAFRAS RIVER BASIN

11. Jacobs Creek near Sassafras

Location.—Lat. 39°21′50″, long. 75°49′13″, on upstream right wing wall of bridge on State Highway 290, 1.2 miles southwest of Sassafras, Kent County, and 1.4 miles upstream from mouth.

Drainage area.—5.39 square miles.

Records available.—June 1951 to September 1956 (discontinued).

Average discharge.—5 years, 5.00 second-feet.

Gage.—Water-stage recorder. Altitude of gage is 10 feet (from topographic map).

Extremes.—Maximum discharge, 229 second-feet Aug. 13, 1955 (gage height, 5.59 ft), from rating curve extended above 73 second-feet by logarithmic plotting; minimum, 1.2 second-feet Aug. 5, 1955.

Monthly discharge of Jacobs Creek near Sassafras

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1951						
June 26–30	5.0	3.1	3.72	0.690	0.13	0.446
July	16	2.3	4.16	.772	.89	.499
August	55	2.7	4.83	.896	1.03	.579
September	5.4	2.2	2.70	.501	.56	.324
The year						
1951–52						
October	5.6	2.3	2.89	0.536	0.62	0.346
November	12	2.4	3.91	.725	.81	.469
December	81	2.4	7.95	1.47	1.70	.950
January	17	4.3	6.55	1.22	1.40	.788
February	54	5.0	8.66	1.61	1.73	1.04
March	26	6.4	9.73	1.81	2.08	1.17
April	61	6.0	12.4	2.30	2.56	1.49
May	20	6.6	8.09	1.50	1.73	.969
June	28	4.6	6.63	1.23	1.37	.795
July	80	4.6	8.47	1.57	1.81	1.01
August	9.8	4.9	6.26	1.16	1.34	.750
September	24	4.9	6.21	1.15	1.29	.743
The year	81	2.3	7.30	1.35	18.44	.873

Monthly discharge of Jacobs Creek near Sassafras—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October	6.9	3.6	4.67	0.866	1.00	0.560
November	30	3.5	5.67	1.05	1.17	.679
December	22	4.5	6.38	1.18	1.37	.763
January	30	5.1	9.51	1.76	2.03	1.14
February	23	5.9	8.00	1.48	1.54	.957
March	31	5.9	10.4	1.93	2.22	1.25
April	19	6.5	9.71	1.80	2.01	1.16
May	36	6.0	8.50	1.58	1.82	1.02
June	17	5.2	7.23	1.34	1.50	.866
July	25	4.5	5.75	1.07	1.23	.692
August	6.0	4.0	4.42	.320	.95	.530
September	4.9	3.8	4.31	.300	.89	.517
The year	36	3.5	7.04	1.31	17.73	.847
1953–54						
October	18	3.7	4.35	0.807	0.93	0.522
November	4.8	3.2	3.89	.722	.81	.467
December	17	3.2	4.70	.872	1.00	.564
January	7.2	3.3	4.61	.855	.99	.553
February	5.6	3.6	4.16	.772	.80	.499
March	8.5	3.3	5.18	.961	1.11	.621
April	6.6	3.6	4.15	.770	.86	.498
May	23	2.9	4.83	.896	1.03	.579
June	2.9	2.3	2.49	.462	.51	.299
July	4.1	2.3	2.58	.479	.55	.310
August	5.4	2.3	2.80	.519	.60	.335
September	5.3	2.4	3.22	.597	.67	.386
The year	23	2.3	3.92	.727	9.86	.470
1954–55						
October	5.5	1.9	2.52	0.468	0.54	0.302
November	7.9	2.4	3.03	.562	.63	.363
December	3.7	2.4	2.75	.510	.59	.330
January	3.1	2.2	2.61	.484	.56	.313
February	10	2.8	3.64	.675	.70	.436
March	8.4	2.6	4.05	.751	.87	.485
April	3.3	2.4	2.67	.495	.55	.320
May	2.7	1.9	2.20	.408	.47	.264
June	11	2.2	3.21	.596	.66	.385
July	27	2.0	3.58	.664	.77	.429
August	107	1.5	8.10	1.50	1.73	.969
September	5.7	2.4	2.58	.479	.53	.310
The year	107	1.5	3.42	.635	8.60	.410

SASSAFRAS RIVER BASIN—*Continued*

Monthly discharge of Jacobs Creek near Sassafras—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1955–56						
October	3.1	2.4	2.54	0.471	0.54	0.304
November	2.8	2.4	2.52	.468	.52	.302
December	2.7	2.2	2.49	.462	.53	.299
January	4.1	2.1	2.44	.453	.52	.293
February	5.1	2.2	3.37	.625	.67	.404
March	16	2.4	4.79	.889	1.02	.575
April	10	2.7	3.84	.712	.79	.460
May	3.6	2.6	2.83	.525	.60	.339
June	4.2	2.6	2.94	.545	.61	.352
July	21	2.5	3.75	.696	.80	.450
August	24	2.5	5.46	1.01	1.17	.653
September	5.1	2.6	3.11	.577	.64	.373
The year	24	2.1	3.34	.620	8.41	.401

Yearly discharge of Jacobs Creek near Sassafras

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1952	7.30	1.35	18.44	0.873	7.47	1.39	18.85	0.898
1953	7.04	1.31	17.73	.847	6.72	1.25	16.93	.808
1954	3.92	.727	9.86	.470	3.52	.653	8.88	.422
1955	3.42	.635	8.60	.410	3.35	.622	8.43	.402
1956	3.34	.620	8.41	.401	—	—	—	—
Highest	7.30	1.35	18.44	.873	7.47	1.39	18.85	.898
Average	5.00	.928	12.61	.600	5.26	.976	13.27	.631
Lowest	3.34	.620	8.41	.401	3.35	.622	8.43	.402

Elk River Basin

12. Big Elk Creek at Elk Mills

Location.—Lat. 39°39′26″, long. 75°49′20″, on right bank 100 feet downstream from highway bridge at Elk Mills, Cecil County, 3½ miles north of Elkton, and 7 miles upstream from confluence with Little Elk Creek.

Drainage area.—52.6 square miles.

Records available.—April 1932 to September 1956.

Gage.—Water-stage recorder. Datum of gage is 68.5 feet above mean sea level, datum of 1929. Prior to May 17, 1946, wire-weight gage at bridge 100 feet upstream at same datum.

Average discharge.—24 years (1932–56), 70.8 second-feet.

Extremes.—Maximum discharge, 10,600 second-feet July 5, 1937 (gage height, 14.5 feet, from floodmarks), from rating curve extended above 1,700 second-feet on basis of velocity-area and conveyance studies; minimum observed, 7 second-feet Sept. 19, 22–24, 1932 (gage height, 2.09 feet).

Maximum stage known, about 19 feet in June 1884, from information by local residents.

Remarks.—Slight diurnal fluctuation caused by mills above station.

Monthly discharge of Big Elk Creek at Elk Mills

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1932						
April	170	38	61.0	1.16	1.29	0.750
May	373	33	65.4	1.24	1.43	.801
June	500	23	53.8	1.02	1.14	.659
July	33	13	19.0	.361	.42	.233
August	60	10	17.2	.327	.38	.211
September	16	7	9.95	.189	.21	.122
The year	—	—	—	—	—	—
1932–33						
October	601	9.5	50.7	0.964	1.11	0.623
November	282	26	61.8	1.17	1.30	.756
December	104	29	46.9	.892	1.03	.577
January	534	32	64.8	1.23	1.42	.795
February	320	40	70.7	1.34	1.40	.866
March	407	43	99.4	1.89	2.18	1.22
April	747	70	146	2.78	3.10	1.80
May	152	57	88.4	1.68	1.94	1.09
June	251	32	57.5	1.09	1.22	.704
July	402	24	63.9	1.21	1.40	.782
August	2,860	21	241	4.58	5.28	2.96
September	370	49	83.0	1.58	1.76	1.02
The year	2,860	9.5	89.7	1.71	23.14	1.11

ELK RIVER BASIN—*Continued*

Monthly discharge of Big Elk Creek at Elk Mills—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1933–34						
October	416	43	63.1	1.20	1.38	0.776
November	136	45	62.6	1.19	1.33	.769
December	176	22	52.0	.989	1.14	.639
January	242	16	74.5	1.42	1.64	.918
February	158	28	504	.958	1.00	.619
March	651	40	129	2.45	2.82	1.58
April	377	69	106	2.02	2.25	1.31
May	256	53	86.2	1.64	1.89	1.06
June	348	37	63.7	1.21	1.35	.782
July	51	22	32.8	.624	.72	.403
August	242	20	44.9	.854	.98	.552
September	271	19	53.3	1.01	1.13	.653
The year	651	16	68.3	1.30	17.63	.840
1934–35						
October	142	31	39.8	0.757	0.87	0.489
November	174	29	46.7	.888	.99	.574
December	240	31	64.1	1.22	1.41	.788
January	280	37	78.8	1.50	1.73	.969
February	500	55	115	2.19	2.28	1.42
March	226	67	91.3	1.74	2.01	1.12
April	525	59	101	1.92	2.14	1.24
May	208	46	67.8	1.29	1.49	.834
June	280	37	67.5	1.28	1.43	.827
July	1,370	35	120	2.28	2.64	1.47
August	101	27	40.6	.772	.89	.499
September	550	30	89.3	1.70	1.90	1.10
The year	1,370	27	76.5	1.45	19.78	.937
1935–36						
October	—	—	45.0	0.856	0.99	0.553
November	—	—	115	2.19	2.44	1.42
December	—	—	70.0	1.33	1.53	.860
January	—	95	250	4.75	5.47	3.07
February	1,000	90	236	4.49	4.84	2.90
March	1,280	80	225	4.28	4.93	2.77
April	800	80	137	2.60	2.90	1.68
May	184	46	71.8	1.37	1.58	.885
June	138	35	49.8	.947	1.06	.612
July	256	23	39.9	.759	.88	.491
August	97	17	27.9	.530	.61	.343
September	21	15	17.4	.331	.37	.214
The year	—	—	107	2.03	27.60	1.31

Monthly discharge of Big Elk Creek at Elk Mills—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1936–37						
October	114	17	27.6	0.525	0.61	0.339
November	37	17	22.1	.420	.47	.271
December	304	21	68.1	1.29	1.49	.834
January	241	40	109	2.07	2.39	1.34
February	410	59	90.5	1.72	1.79	1.11
March	158	50	72.6	1.38	1.59	.892
April	256	47	85.6	1.63	1.82	1.05
May	145	37	58.8	1.12	1.29	.724
June	170	28	48.3	.918	1.02	.593
July	1,630	18	120	2.28	2.63	1.47
August	1,450	11	154	2.93	3.38	1.89
September	76	31	46.0	.875	.98	.566
The year	1,630	11	75.3	1.43	19.46	.924
1937–38						
October	768	34	89.6	1.70	1.96	1.10
November	800	39	88.0	1.67	1.87	1.08
December	104	40	56.4	1.07	1.23	.692
January	380	43	68.2	1.30	1.50	.840
February	245	41	76.1	1.45	1.51	.937
March	182	36	70.8	1.35	1.56	.873
April	125	44	58.7	1.12	1.25	.724
May	113	39	49.8	.947	1.09	.612
June	800	25	89.8	1.71	1.91	1.11
July	840	31	122	2.32	2.68	1.50
August	192	31	62.6	1.19	1.37	.769
September	860	30	112	2.13	2.38	1.38
The year	860	25	78.6	1.49	20.31	.963
1938–39						
October	72	37	49.5	0.941	1.08	0.608
November	65	39	46.5	.884	.99	.571
December	224	43	70.7	1.34	1.54	.866
January	695	40	80.5	1.53	1.76	.989
February	1,190	86	199	3.78	3.94	2.44
March	235	88	127	2.41	2.78	1.56
April	340	86	143	2.72	3.04	1.76
May	95	47	70.7	1.34	1.54	.866
June	158	37	58.4	1.11	1.24	.717
July	74	20	33.9	.644	.74	.416
August	1,340	13	75.7	1.44	1.66	.931
September	95	19	29.2	.555	.62	.359
The year	1,340	13	81.2	1.54	20.93	.995

Monthly discharge of Big Elk Creek at Elk Mills—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1939–40						
October	247	28	54.6	1.04	1.20	0.672
November	108	31	40.1	.762	.85	.492
December	65	25	37.0	.703	.81	.454
January	461	24	51.0	.970	1.12	.627
February	760	26	99.1	1.88	2.03	1.22
March	978	35	156	2.97	3.42	1.92
April	626	54	118	2.24	2.50	1.45
May	348	55	99.7	1.90	2.19	1.23
June	114	33	56.7	1.08	1.20	.698
July	48	24	31.8	.605	.70	.391
August	128	22	32.0	.608	.70	.393
September	254	22	37.7	.717	.80	.463
The year	978	22	67.6	1.29	17.52	.834
1940–41						
October	105	24	33.6	0.639	0.74	0.413
November	313	28	66.3	1.26	1.41	.814
December	285	31	50.1	.952	1.10	.615
January	328	21	68.4	1.30	1.50	.840
February	950	26	94.4	1.79	1.87	1.16
March	596	35	91.7	1.74	2.01	1.12
April	210	36	61.0	1.16	1.29	.750
May	51	26	32.7	.622	.72	.402
June	70	22	32.2	.612	.68	.369
July	1,110	18	84.2	1.60	1.84	1.03
August	233	16	28.1	.534	.62	.345
September	18	12	14.0	.266	.30	.172
This year	1,110	12	54.5	1.04	14.08	.672
1941–42						
October	27	10	14.3	0.272	0.31	0.176
November	47	11	17.4	.331	.37	.214
December	200	13	32.7	.622	.72	.402
January	260	13	31.4	.597	.69	.386
February	942	18	68.4	1.30	1.35	.840
March	829	21	87.3	1.66	1.91	1.07
April	171	29	46.1	.876	.98	.566
May	250	26	46.0	.875	1.01	.566
June	86	19	27.1	.515	.58	.333
July	310	15	56.8	1.08	1.24	.698
August	661	22	117	2.22	2.57	1.43
September	284	22	43.6	.829	.92	.536
The year	942	10	49.0	.932	12.65	.602

ELK RIVER BASIN—*Continued*

Monthly discharge of Big Elk Creek at Elk Mills—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1942–43						
October	441	22	69.9	1.33	1.53	0.860
November	176	33	56.4	1.07	1.20	.692
December	547	40	103	1.96	2.25	1.27
January	140	55	68.7	1.31	1.51	.847
February	341	50	96.7	1.84	1.91	1.19
March	250	60	94.4	1.79	2.07	1.16
April	816	64	106	2.02	2.26	1.31
May	1,200	54	156	2.97	3.42	1.92
June	395	40	95.8	1.82	2.03	1.18
July	500	33	79.2	1.51	1.74	.976
August	31	16	23.7	.451	.52	.291
September	33	14	17.8	.338	.38	.218
The year	1,200	14	80.6	1.53	20.82	.989
1943–44						
October	90	20	33.2	0.631	0.73	0.408
November	304	31	54.6	1.04	1.16	.672
December	111	21	32.5	.618	.71	.399
January	1,350	22	115	2.19	2.52	1.42
February	329	28	50.8	.966	1.04	.624
March	647	38	99.5	1.89	2.18	1.22
April	208	52	83.4	1.59	1.77	1.03
May	92	35	52.4	.996	1.15	.644
June	94	22	34.4	.654	.73	.423
July	27	13	18.1	.344	.40	.222
August	77	12	18.5	.352	.41	.228
September	736	10	44.6	.848	.95	.548
The year	1,350	10	53.1	1.01	13.75	.653
1944–45						
October	82	12	21.3	0.405	0.47	0.262
November	154	14	36.3	.690	.77	.446
December	260	26	43.4	.825	.95	.533
January	620	26	63.2	1.20	1.38	.776
February	460	29	122	2.32	2.41	1.50
March	134	34	55.8	1.06	1.22	.685
April	203	33	51.4	.977	1.09	.631
May	134	29	49.8	.947	1.09	.612
June	160	19	41.1	.781	.87	.505
July	1,370	27	131	2.49	2.87	1.61
August	928	40	126	2.40	2.77	1.55
September	1,610	39	115	2.19	2.44	1.42
The year	1,610	12	71.1	1.35	18.33	.873

Monthly discharge of Big Elk Creek at Elk Mills—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1945–46						
October	77	30	47.2	0.897	1.03	0.580
November	391	35	66.8	1.27	1.42	.821
December	361	40	84.5	1.61	1.85	1.04
January	126	52	69.5	1.32	1.52	.853
February	228	49	82.6	1.57	1.64	1.01
March	134	54	74.0	1.41	1.62	.911
April	81	43	52.1	.990	1.11	.640
May	396	38	84.3	1.60	1.85	1.03
June	1,170	48	113	2.15	2.40	1.39
July	1,550	37	106	2.02	2.32	1.31
August	80	35	47.0	.894	1.03	.578
September	96	26	36.5	.694	.77	.449
The year	1,550	26	71.9	1.37	18.56	.885
1946–47						
October	75	30	39.2	0.745	0.86	0.482
November	57	30	36.1	.686	.77	.443
December	140	27	38.5	.732	.84	.473
January	137	37	56.8	1.08	1.25	.698
February	52	30	41.4	.787	.82	.509
March	230	41	64.5	1.23	1.41	.795
April	613	40	71.5	1.36	1.52	.879
May	635	44	94.7	1.80	2.08	1.16
June	126	39	54.6	1.04	1.16	.672
July	895	30	89.2	1.70	1.95	1.10
August	114	22	29.8	.567	.65	.366
September	44	22	29.3	.557	.62	.360
The year	895	22	54.0	1.03	13.93	.666
1947–48						
October	58	18	22.7	0.432	0.50	0.279
November	450	22	64.9	1.23	1.38	.795
December	157	24	36.0	.684	.79	.442
January	910	32	92.6	1.76	2.03	1.14
February	867	50	138	2.62	2.82	1.69
March	156	63	89.5	1.70	1.96	1.10
April	412	58	91.6	1.74	1.94	1.12
May	543	54	139	2.64	3.04	1.71
June	535	56	94.5	1.80	2.01	1.16
July	255	34	57.6	1.10	1.26	.711
August	100	27	44.5	.846	.98	.547
September	82	25	31.5	.599	.67	.387
The year	910	18	74.8	1.42	19.38	.918

Elk River Basin—*Continued*

Monthly discharge of Big Elk Creek at Elk Mills—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1948–49						
October	90	28	35.9	0.683	0.79	0.441
November	264	29	51.7	.983	1.10	.635
December	788	45	95.3	1.81	2.09	1.17
January	481	56	122	2.32	2.66	1.50
February	187	91	123	2.34	2.44	1.51
March	396	82	105	2.00	2.30	1.29
April	158	65	88.7	1.69	1.88	1.09
May	163	53	75.4	1.43	1.65	.924
June	58	33	42.2	.802	.90	.518
July	495	28	67.5	1.28	1.48	.827
August	378	22	45.1	.857	.99	.554
September	51	21	28.1	.534	.60	.345
The year	788	21	73.1	1.39	18.88	.898
1949–50						
October	108	25	36.2	0.688	0.79	0.445
November	51	24	29.6	.563	.63	.364
December	147	25	44.8	.852	.98	.551
January	84	35	40.5	.770	.89	.498
February	172	37	74.6	1.42	1.48	.918
March	619	30	96.5	1.83	2.11	1.18
April	127	51	61.5	1.17	1.30	.756
May	223	46	75.3	1.43	1.65	.924
June	112	32	52.0	.989	1.10	.639
July	270	23	40.4	.768	.89	.496
August	1,020	24	66.6	1.27	1.46	.821
September	224	24	44.0	.837	.93	.541
The year	1,020	23	55.1	1.05	14.21	.679
1950–51						
October	265	28	46.7	0.888	1.02	0.574
November	1,210	32	86.4	1.64	1.83	1.06
December	355	29	72.1	1.37	1.58	.885
January	624	50	86.5	1.64	1.89	1.06
February	679	63	133	2.53	2.63	1.64
March	402	58	92.2	1.75	2.02	1.13
April	272	66	95.1	1.81	2.02	1.17
May	201	50	67.9	1.29	1.49	.834
June	142	38	57.7	1.10	1.22	.711
July	306	31	64.0	1.22	1.40	.788
August	82	20	29.6	.563	.65	.364
September	42	14	21.9	.416	.46	.269
The year	1,210	14	70.6	1.34	18.21	.866

ELK RIVER BASIN—*Continued*

Monthly discharge of Big Elk Creek at Elk Mills—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1951–52						
October	67	13	23.7	0.451	0.52	0.291
November	495	35	80.5	1.53	1.71	.989
December	1,550	36	126	2.40	2.76	1.55
January	266	65	103	1.96	2.25	1.27
February	518	68	101	1.92	2.07	1.24
March	984	75	146	2.78	3.20	1.80
April	565	81	146	2.78	3.10	1.80
May	612	83	145	2.76	3.18	1.78
June	322	63	98.0	1.86	2.08	1.20
July	592	42	85.4	1.62	1.87	1.05
August	182	44	73.8	1.40	1.62	.905
September	772	38	82.3	1.56	1.75	1.01
The year	1,550	13	101	1.92	26.11	1.24
1952–53						
October	48	36	39.3	0.747	0.86	0.483
November	909	33	89.5	1.70	1.90	1.10
December	812	51	103	1.96	2.25	1.27
January	836	64	158	3.00	3.46	1.94
February	311	82	111	2.11	2.20	1.36
March	406	84	153	2.91	3.35	1.88
April	268	95	133	2.53	2.82	1.64
May	308	74	112	2.13	2.46	1.38
June	235	56	86.9	1.65	1.84	1.07
July	142	41	52.2	.992	1.14	.641
August	58	21	35.1	.667	.77	.431
September	67	20	27.9	.530	.59	.343
The year	909	20	91.6	1.74	23.64	1.12
1953–54						
October	246	18	34.2	0.650	0.75	0.420
November	88	27	49.5	.941	1.05	.608
December	495	36	80.5	1.53	1.76	.989
January	185	35	52.8	1.00	1.16	.646
February	64	27	42.1	.800	.83	.517
March	324	50	82.8	1.57	1.81	1.01
April	138	43	62.8	1.19	1.33	.769
May	273	35	61.1	1.16	1.34	.750
June	34	19	26.7	.508	.57	.328
July	24	9.0	16.5	.314	.36	.203
August	37	7.8	18.2	.346	.40	.224
September	69	11	18.8	.357	.40	.231
The year	495	7.8	45.6	.867	11.76	.560

ELK RIVER BASIN—*Continued*

Monthly discharge of Big Elk Creek at Elk Mills—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1954–55						
October	49	12	17.3	0.329	0.38	0.213
November	116	16	27.1	.515	.58	.333
December	165	15	34.5	.656	.76	.424
January	44	13	24.1	.458	.53	.296
February	601	20	70.6	1.34	1.40	.866
March	304	36	70.4	1.34	1.54	.866
April	85	33	44.0	.837	.93	.541
May	34	22	26.8	.510	.59	.330
June	151	19	43.5	.827	.92	.534
July	28	10	16.3	.310	.36	.200
August	1,910	8.0	227	4.32	4.97	2.79
September	81	39	47.5	.903	1.01	.584
The year	1,910	8.0	54.1	1.03	13.97	.666
1955–56						
October	104	30	46.4	0.882	1.02	0.570
November	79	30	38.2	.728	.81	.471
December	39	23	29.4	.559	.64	.361
January	400	20	46.5	.884	1.02	.571
February	424	45	105	2.00	2.15	1.29
March	534	40	91.5	1.74	2.01	1.12
April	205	55	77.5	1.47	1.64	.950
May	90	39	50.7	.964	1.11	.623
June	218	30	60.5	1.15	1.28	.743
July	497	28	59.9	1.14	1.31	.737
August	104	20	29.6	.563	.65	.364
September	60	18	24.7	.470	.52	.304
The year	534	18	54.8	1.04	14.16	.672

ELK RIVER BASIN—*Continued*

Yearly discharge of Big Elk Creek at Elk Mills

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1933	89.7	1.71	23.14	1.11	91.3	1.74	23.55	1.12
1934	68.3	1.30	17.63	.840	66.0	1.25	17.05	.808
1935	76.5	1.45	19.78	.937	83.1	1.58	21.47	1.02
1936	107	2.03	27.60	1.31	97.4	1.85	25.21	1.20
1937	75.3	1.43	19.46	.924	85.0	1.62	21.95	1.05
1938	78.6	1.49	20.31	.963	73.0	1.39	18.86	.898
1939	81.2	1.54	20.93	.995	78.2	1.49	20.18	.963
1940	67.6	1.29	17.52	.834	69.1	1.31	17.91	.847
1941	54.5	1.04	14.08	.672	47.4	.901	12.23	.582
1942	49.0	.932	12.65	.602	62.9	1.20	16.23	.776
1943	80.6	1.53	20.82	.989	71.4	1.36	18.44	.879
1944	53.1	1.01	13.75	.653	51.5	.979	13.34	.633
1945	71.1	1.35	18.33	.873	79.3	1.51	20.44	.976
1946	71.9	1.37	18.56	.885	64.8	1.23	16.73	.795
1947	54.0	1.03	13.93	.666	54.7	1.04	14.13	.672
1948	74.8	1.42	19.38	.918	79.9	1.52	20.69	.982
1949	73.1	1.39	18.88	.898	67.1	1.28	17.30	.827
1950	55.1	1.05	14.21	.679	63.0	1.20	16.24	.776
1951	70.6	1.34	18.21	.866	72.8	1.38	18.77	.892
1952	101	1.92	26.11	1.24	101	1.92	26.13	1.24
1953	91.6	1.74	23.64	1.12	86.0	1.63	22.19	1.05
1954	45.6	.867	11.76	.560	38.4	.730	9.92	.472
1955	54.1	1.03	13.97	.666	57.1	1.09	14.72	.704
1956	54.8	1.04	14.16	.672	—	—	—	—
Highest	107	2.03	27.60	1.31	101	1.92	26.13	1.24
Average	70.8	1.35	18.28	.873	71.3	1.36	18.42	.879
Lowest	45.6	.867	11.76	.560	38.4	.730	9.92	.472

Elk River Basin

13. Little Elk Creek at Childs

Location.—Lat. 39°38′30″, long. 75°52′00″, on right bank at downstream side of highway bridge 0.2 mile southeast of Childs, Cecil County, 1.6 miles upstream from Laurel Run, 2.4 miles northwest of Elkton, and 6.1 miles upstream from confluence with Big Elk Creek.

Drainage area.—26.8 square miles.

Records available.—October 1948 to September 1956.

Gage.—Water-stage recorder and concrete control. Datum of gage is 66.72 feet above mean sea level, datum of 1929.

Average discharge.—8 years, 36.1 second-feet.

Extremes.—Maximum discharge, 5,400 second-feet Aug. 12, 1955 (gage height, 8.37 feet), from rating curve extended above 690 second-feet on basis of slope-area determination at gage height 5.24 feet and computation of peak flow over dam three-quarters of a mile upstream for same flood; minimum, 0.4 second-feet July 31, Sept. 5, 1954 (gage height, 1.31 feet); minimum daily, 3.3 second-feet July 31, 1954.

Remarks.—Some regulation by paper mills above station.

Monthly discharge of Little Elk Creek at Childs

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1948–49						
October	30	11	14.1	0.526	0.61	0.340
November	171	11	24.3	.907	1.01	.586
December	507	23	56.8	2.12	2.44	1.37
January	376	25	72.7	2.71	3.13	1.75
February	126	41	65.8	2.46	2.56	1.59
March	297	32	50.9	1.90	2.19	1.23
April	100	32	43.7	1.63	1.82	1.05
May	90	23	33.5	1.25	1.44	.808
June	23	14	17.6	.657	.73	.425
July	449	11	43.6	1.63	1.88	1.05
August	144	10	20.0	.746	.86	.482
September	26	8.5	11.8	.440	.49	.284
The year	507	8.5	37.8	1.41	19.16	.911
1949–50						
October	66	9.2	15.8	0.590	0.68	0.381
November	25	10	13.5	.504	.56	.326
December	118	11	25.7	.959	1.10	.620
January	60	15	18.9	.705	.81	.456
February	141	17	49.7	1.85	1.93	1.20
March	464	15	59.8	2.23	2.57	1.44
April	99	23	30.1	1.12	1.25	.724
May	167	23	44.7	1.67	1.92	1.08
June	123	15	29.4	1.10	1.22	.711
July	73	12	18.3	.683	.79	.441
August	395	9.2	27.4	1.02	1.18	.659
September	238	8.5	28.8	1.07	1.20	.692
The year	464	8.5	30.1	1.12	15.21	.724

Monthly discharge of Little Elk Creek at Childs—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1950–51						
October	184	12	23.4	0.873	1.01	0.564
November	699	14	46.0	1.72	1.91	1.11
December	256	14	39.4	1.47	1.69	.950
January	369	17	41.6	1.55	1.79	1.00
February	350	30	76.8	2.87	2.98	1.85
March	348	23	51.2	1.91	2.20	1.23
April	167	30	49.4	1.84	2.06	1.19
May	171	23	38.0	1.42	1.63	.918
June	105	20	30.8	1.15	1.28	.743
July	369	15	35.7	1.33	1.54	.860
August	15	9.2	12.1	.451	.52	.291
September	16	5.3	10.0	.373	.42	.241
The year	699	5.3	37.6	1.40	19.03	.905
1951–52						
October	21	7.1	9.41	0.351	0.40	0.227
November	319	15	41.9	1.56	1.74	1.01
December	876	15	63.1	2.35	2.17	1.52
January	211	29	59.1	2.21	2.54	1.43
February	465	29	53.1	1.98	2.14	1.28
March	674	32	83.3	3.11	3.58	2.01
April	418	36	87.2	3.25	3.63	2.10
May	477	36	77.8	2.90	3.35	1.87
June	228	26	43.5	1.62	1.81	1.05
July	262	17	36.1	1.35	1.55	.873
August	113	17	34.0	1.27	1.46	.821
September	550	16	41.8	1.56	1.74	1.01
This year	876	7.1	52.5	1.96	26.65	1.27
1952–53						
October	21	12	14.6	0.545	0.63	0.352
November	432	14	44.2	1.65	1.84	1.07
December	494	21	52.0	1.94	2.24	1.25
January	587	27	88.6	3.31	3.81	2.14
February	241	35	57.7	2.15	2.24	1.39
March	254	36	86.6	3.23	3.72	2.09
April	199	41	69.4	2.59	2.89	1.67
May	283	33	63.0	2.35	2.71	1.52
June	153	23	44.1	1.65	1.84	1.07
July	59	16	20.2	.754	.87	.487
August	24	7.3	14.8	.552	.64	.357
September	57	7.3	13.6	.507	.57	.328
The year	587	7.3	47.4	1.77	24.00	1.14

Monthly discharge of Little Elk Creek at Childs—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1953–54						
October	144	6.6	14.7	0.549	0.63	0.355
November	49	11	23.8	.888	.99	.574
December	427	16	47.2	1.76	2.03	1.14
January	149	13	26.3	.981	1.13	.634
February	42	11	20.4	.761	.79	.492
March	217	22	43.5	1.62	1.87	1.05
April	89	19	31.1	1.16	1.29	.750
May	189	16	31.6	1.18	1.36	.763
June	56	8.8	15.4	.575	.64	.372
July	13	3.3	8.46	.316	.36	.204
August	15	5.0	8.66	.323	.37	.209
September	15	4.2	7.97	.297	.33	.192
The year	427	3.3	23.3	.869	11.79	.562
1954–55						
October	30	5.6	9.22	0.344	0.40	0.222
November	48	7.8	13.1	.489	.55	.316
December	150	8.2	21.9	.817	.94	.528
January	22	8.8	12.3	.459	.53	.297
February	370	9.5	38.0	1.42	1.48	.918
March	260	16	42.8	1.60	1.84	1.03
April	53	14	22.1	.825	.92	.533
May	16	7.6	11.1	.414	.48	.268
June	94	7.6	28.9	1.08	1.20	.698
July	13	5.3	8.79	.328	.38	.212
August	1030	4.6	131	4.89	5.62	3.16
September	31	14	19.3	.720	.80	.465
The year	1030	4.6	29.9	1.12	15.14	.724
1955–56						
October	45	15	21.1	0.787	0.91	0.509
November	44	14	19.3	.720	.80	.465
December	15	11	12.9	.481	.56	.311
January	220	8.6	21.8	.813	.94	.525
February	224	20	56.5	2.11	2.27	1.36
March	394	18	53.5	2.00	2.30	1.29
April	144	24	39.3	1.47	1.64	.950
May	53	19	24.0	.896	1.03	.579
June	186	16	40.0	1.49	1.66	.963
July	432	9.5	38.9	1.45	1.67	.937
August	140	13	23.3	.869	1.00	.562
September	48	11	15.0	.560	.62	.362
The year	432	8.6	30.3	1.13	15.40	.730

ELK RIVER BASIN—*Continued*

Yearly discharge of Little Elk Creek at Childs

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1949	37.8	1.41	19.16	0.911	34.4	1.28	17.44	0.827
1950	30.1	1.12	15.21	.724	34.5	1.29	17.48	.834
1951	37.6	1.40	19.03	.905	38.1	1.42	19.27	.918
1952	52.5	1.96	26.65	1.27	52.2	1.95	26.51	1.26
1953	47.4	1.77	24.00	1.14	45.3	1.69	22.94	1.09
1954	23.3	.869	11.79	.562	19.8	.739	10.03	.478
1955	29.9	1.12	15.14	.724	30.6	1.14	15.52	.737
1956	30.3	1.13	15.40	.730	—	—	—	—
Highest	52.5	1.96	26.65	1.27	52.2	1.95	26.51	1.26
Average	36.1	1.35	18.30	.873	36.4	1.36	18.46	.879
Lowest	23.3	.869	11.79	.562	19.8	.739	10.03	.478

ELK RIVER BASIN

14. Little Bohemia Creek near Warwick

Location.—Lat. 39°26′05″, long. 75°48′25″, on left downstream wing wall of highway bridge 0.2 mile southwest of St. Francis Xavier Church and 2 miles northwest of Warwick, Cecil County.

Drainage area.—2.45 square miles.

Records available.—October 1952 to September 1953 (discontinued).

Gage.—Staff gage; read intermittently.

Remarks.—Partial-record station with monthly discharge only; records based on 24 discharge measurements from Oct. 13, 1952 to Oct. 8, 1953. Standard error of estimate of monthly discharge about 9 percent.

Monthly discharge of Little Bohemia Creek near Warwick

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1952–53						
October			2.17	0.886	1.02	0.573
November			3.10	1.27	1.41	.821
December			2.80	1.14	1.32	.737
January			3.91	1.60	1.84	1.03
February			3.45	1.41	1.47	.911
March			4.66	1.90	2.19	1.23
April			4.48	1.83	2.04	1.18
May			3.75	1.53	1.76	.989
June			3.51	1.43	1.60	.924
July			2.70	1.10	1.27	.711
August			1.99	.812	.94	.525
September			1.95	.796	.89	.514
The year			3.20	1.31	17.75	.847

Northeast River Basin

15. Northeast Creek at Leslie

Location.—Lat. 39°37′40″, long. 75°56′40″, on left bank at downstream side of highway bridge 0.7 miles northeast of Leslie, Cecil County, 1.5 miles southeast of Bay View, and 1.7 miles upstream from confluence with Little Northeast Creek.

Drainage area.—24.3 square miles.

Records available.—October 1948 to September 1956.

Gage.—Water-stage recorder and concrete control. Datum of gage is 115.0 feet above mean sea level, datum of 1929.

Average discharge.—8 years, 33.4 second-feet.

Extremes.—Maximum discharge, 2,590 second-feet Aug. 13, 1955 (gage height, 6.30 feet), from rating curve extended above 920 second-feet on basis of slope-area determination at gage height 5.06 feet; minimum, 1.4 second-feet Mar. 3, 1950, result of freezeup; minimum daily, 2.4 second-feet Aug. 2, 1954.

Remarks.—Slight regulation at low flow by power plant above station.

Monthly discharge of Northeast Creek at Leslie

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1948–49						
October	25	7.4	9.69	0.399	0.46	0.258
November	233	7.4	22.3	.918	1.02	.593
December	623	14	58.0	2.39	2.75	1.54
January	532	21	88.7	3.65	4.21	2.36
February	170	32	69.4	2.86	2.97	1.85
March	434	23	46.7	1.92	2.22	1.24
April	168	21	40.1	1.65	1.84	1.07
May	88	14	26.9	1.11	1.27	.717
June	15	8.0	10.7	.440	.49	.284
July	810	8.0	46.0	1.89	2.18	1.22
August	91	6.8	14.6	.601	.69	.388
September	15	6.1	8.06	.332	.37	.215
The year	810	6.1	36.7	1.51	20.47	.976
1949–50						
October	60	6.8	12.7	0.523	0.60	0.338
November	26	9.1	11.7	.481	.54	.311
December	128	9.1	23.6	.971	1.12	.628
January	58	13	17.5	.720	.83	.465
February	120	12	40.9	1.68	1.75	1.09
March	598	9.6	62.6	2.58	2.97	1.67
April	71	17	24.2	.996	1.11	.644
May	154	15	31.7	1.30	1.50	.840
June	147	8.7	21.4	.881	.98	.569
July	64	7.1	12.5	.514	.59	.332
August	462	6.6	27.6	1.14	1.31	.737
September	86	7.1	19.6	.806	.90	.521
The year	598	6.6	25.4	1.05	14.20	.679

NORTHEAST RIVER BASIN—*Continued*

Monthly discharge of Northeast Creek at Leslie—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1950–51						
October	180	8.9	19.8	0.815	0.94	0.527
November	560	12	47.2	1.94	2.17	1.25
December	311	12	45.2	1.86	2.15	1.20
January	416	17	43.8	1.80	2.08	1.16
February	331	23	79.2	3.26	3.39	2.11
March	504	22	51.5	2.12	2.44	1.37
April	192	19	41.9	1.72	1.92	1.11
May	119	13	22.5	.926	1.07	.598
June	100	11	19.5	.802	.89	.518
July	769	9.9	44.0	1.81	2.09	1.17
August	12	5.4	8.20	.337	.39	.218
September	6.7	4.1	5.19	.214	.24	.138
The year	769	4.1	35.4	1.46	19.77	.944
1951–52						
October	17	4.4	6.97	0.287	0.33	0.185
November	334	12	44.7	1.84	2.05	1.19
December	1,300	14	81.2	3.34	3.85	2.16
January	237	25	63.6	2.62	3.02	1.69
February	509	20	48.0	1.98	2.13	1.28
March	958	21	86.3	3.55	4.10	2.29
April	510	22	86.6	3.56	3.98	2.30
May	639	21	71.5	2.94	3.39	1.90
June	152	12	24.8	1.02	1.14	.659
July	209	8.4	21.6	.889	1.02	.575
August	133	9.5	24.1	.992	1.14	.641
September	711	10	41.3	1.70	1.90	1.10
The year	1,300	4.4	50.1	2.06	28.05	1.33
1952–53						
October	13	8.5	9.24	0.380	0.44	0.246
November	808	8.7	48.7	2.00	2.24	1.29
December	523	18	52.1	2.14	2.47	1.38
January	773	24	106	4.36	5.03	2.82
February	250	27	56.6	2.33	2.42	1.51
March	350	24	87.6	3.60	4.16	2.33
April	224	29	61.0	2.51	2.80	1.62
May	501	21	62.3	2.56	2.95	1.65
June	211	14	35.6	1.47	1.64	.950
July	25	7.7	10.6	.436	.50	.282
August	9.5	5.1	7.20	.296	.34	.191
September	51	4.1	8.86	.365	.41	.236
The year	808	4.1	45.5	1.87	25.40	1.21

Monthly discharge of Northeast Creek at Leslie—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1953–54						
October	69	5.5	10.5	0.432	0.50	0.279
November	44	7.8	20.0	.823	.92	.532
December	438	13	50.2	2.07	2.38	1.34
January	197	12	28.3	1.16	1.34	.750
February	49	10	18.6	.765	.80	.494
March	249	19	47.0	1.93	2.23	1.25
April	105	14	27.9	1.15	1.28	.743
May	401	11	33.1	1.36	1.57	.879
June	37	5.5	9.59	.395	.44	.255
July	8.2	2.8	5.12	.211	.24	.136
August	26	2.4	5.68	.234	.27	.151
September	6.8	2.8	3.99	.164	.18	.106
The year	438	2.4	21.8	.897	12.15	.580
1954–55						
October	15	3.1	4.64	0.191	0.22	0.123
November	37	4.9	9.42	.388	.43	.251
December	147	6.4	18.3	.753	.87	.487
January	22	6.8	11.2	.461	.53	.298
February	600	9	40.8	1.68	1.75	1.09
March	284	15	43.6	1.79	2.07	1.16
April	94	13	25.0	1.03	1.15	.666
May	16	8.2	10.9	.449	.52	.290
June	149	6.8	32.8	1.35	1.51	.873
July	12	4.6	7.04	.290	.33	.187
August	1,530	3.8	108	4.44	5.14	2.87
September	24	10	14.0	.576	.64	.372
The year	1,530	3.1	27.1	1.12	15.16	.724
1955–56						
October	37	10	14.6	0.601	0.69	0.388
November	33	11	13.0	.535	.60	.346
December	13	9.0	10.4	.428	.49	.277
January	152	8.0	18.1	.745	.86	.482
February	242	17	58.7	2.42	2.60	1.56
March	409	15	54.5	2.24	2.58	1.45
April	156	19	34.5	1.42	1.58	.918
May	36	12	17.2	.708	.81	.458
June	94	9.2	23.8	.979	1.09	.633
July	447	8.3	32.4	1.33	1.54	.860
August	167	8.3	17.5	.720	.83	.465
September	37	7.0	10.5	.432	.48	.279
The year	447	7.0	25.3	1.04	14.15	.672

NORTHEAST RIVER BASIN—*Continued*

Yearly discharge of Northeast Creek at Leslie

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1949	36.7	1.51	20.47	0.976	33.1	1.36	18.50	0.879
1950	25.4	1.05	14.20	.679	30.8	1.27	17.20	.821
1951	35.4	1.46	19.77	.944	37.1	1.53	20.74	.989
1952	50.1	2.06	28.05	1.33	48.1	1.98	26.97	1.28
1953	45.5	1.87	25.40	1.21	43.1	1.77	24.05	1.14
1954	21.8	.897	12.15	.580	17.7	.728	9.87	.471
1955	27.1	1.12	15.16	.724	27.6	1.14	15.42	.737
1956	25.3	1.04	14.15	.672	—	—	—	—
Highest	50.1	2.06	28.05	1.33	48.1	1.98	26.97	1.28
Average	33.4	1.37	18.67	.885	33.9	1.40	18.96	.905
Lowest	21.8	.897	12.15	.580	17.7	.728	9.87	.471

16. Octoraro Creek near Rising Sun

Location.—Lat. 39°41′27″, long. 76°07′38″, on right bank 10 feet downstream from Porter Bridge, 300 feet downstream from Love Run, 3½ miles upstream from mouth, and 3½ miles west of Rising Sun, Cecil County.

Drainage area.—193 square miles.

Records available.—April 1932 to September 1956.

Gage.—Water-stage recorder. Datum of gage is 73.77 feet above mean sea level, adjustment of 1912. Prior to May 19, 1946, wire-weight gage at bridge 10 feet upstream at same datum.

Average discharge.—24 years, 256 second-feet (adjusted for storage and diversion since October 1951).

Extremes.—Maximum discharge, 35,000 second-feet Aug. 9, 1942 (gage height, 17.57 feet), from rating curve extended above 5,000 second-feet on basis of velocity-area studies; minimum, 24 second-feet Sept. 19, 1932, Feb. 21, 1947.

Floods of 1884 and 1918 reached stages of 24.3 and 16.5 feet, respectively, present datum, from floodmarks.

Remarks.—Slight diurnal fluctuation caused by mills above station. Flow regulated by Pine Grove Reservoir beginning Feb. 22, 1951 (capacity, 2,800,000,000 gallons). Diversion above station by Octoraro Water Company and from Pine Grove Reservoir beginning November 1951 by Chester Municipal Authority for municipal supply of Chester and surrounding boroughs. Records prior to 1952 do not include a mean discharge of between 0.77 and 3 second-feet diverted above station by Octoraro Water Company.

Monthly discharge of Octoraro Creek near Rising Sun

Month	Observed discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1932						
April	515	125	210	1.09	1.21	0.704
May	814	125	210	1.09	1.25	.704
June	290	71	120	.622	.69	.402
July	292	55	77.3	.401	.46	.259
August	215	40	61.7	.320	.37	.207
September	61	30	40.3	.209	.23	.135
The year						
1932–33						
October	570	34	98.2	0.509	0.59	0.329
November	1,250	103	288	1.49	1.66	.963
December	694	107	194	1.01	1.16	.653
January	610	139	197	1.02	1.18	.659
February	814	129	261	1.35	1.41	.873
March	1,590	169	393	2.04	2.35	1.32
April	1,810	292	521	2.70	3.01	1.75
May	584	255	364	1.89	2.17	1.22
June	584	137	217	1.12	1.26	.724
July	2,300	96	242	1.25	1.45	.808
August	13,700	87	1,174	6.08	7.01	3.93
September	980	238	368	1.91	2.13	1.23
The year	13,700	34	361	1.87	25.38	1.21

Monthly discharge of Octoraro Creek near Rising Sun—*Continued*

Month	Observed discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1933–34						
October	415	189	232	1.20	1.38	0.776
November	274	139	176	.912	1.02	.589
December	352	116	170	.881	1.01	.569
January	584	118	260	1.35	1.55	.873
February	250	120	159	.824	.86	.533
March	1,540	160	392	2.03	2.34	1.31
April	1,630	268	406	2.10	2.35	1.36
May	1,280	214	346	1.79	2.06	1.16
June	722	158	216	1.12	1.25	.724
July	721	101	159	.824	.95	.533
August	367	85	135	.699	.81	.452
September	980	75	269	1.39	1.56	.898
The year	1,630	75	244	1.26	17.14	.814
1934–35						
October	306	115	160	0.829	0.95	0.536
November	556	123	189	.979	1.09	.533
December	845	182	275	1.42	1.64	.918
January	752	170	274	1.42	1.64	.918
February	1,200	210	396	2.05	2.14	1.32
March	980	286	358	1.85	2.14	1.20
April	1,360	249	405	2.09	2.33	1.35
May	556	182	269	1.39	1.61	.898
June	1,120	158	277	1.44	1.60	.931
July	7,540	148	512	2.65	3.06	1.72
August	458	115	172	.891	1.03	.576
September	1,540	124	303	1.57	1.75	1.01
The year	7,540	115	298	1.54	20.98	.995
1935–36						
October	—	—	140	0.725	0.84	0.469
November	—	—	325	1.68	1.88	1.09
December	—	—	215	1.11	1.28	.717
January	—	250	710	3.68	4.24	2.38
February	2,780	210	498	2.58	2.78	1.67
March	2,910	327	786	4.07	4.70	2.63
April	1,280	308	489	2.53	2.82	1.64
May	665	184	271	1.40	1.62	.905
June	270	135	176	.912	1.02	.589
July	193	93	129	.668	.77	.432
August	234	63	103	.534	.62	.345
September	91	55	76.9	.398	.44	.257
The year			326	1.69	23.01	1.09

Susquehanna River Basin—*Continued*

Monthly discharge of Octoraro Creek near Rising Sun—*Continued*

Month	Observed discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1936–37						
October	187	72	90.5	0.469	0.54	0.303
November	106	69	80.0	.415	.46	.268
December	982	77	191	.990	1.14	.640
January	722	151	336	1.74	2.01	1.12
February	1,540	211	323	1.67	1.74	1.08
March	584	193	249	1.29	1.49	.834
April	814	182	292	1.51	1.69	.976
May	435	171	238	1.23	1.42	.795
June	435	125	177	.917	1.03	.593
July	1,340	104	202	1.05	1.21	.679
August	827	96	226	1.17	1.35	.756
September	193	96	125	.648	.72	.419
The year	1,540	69	210	1.09	14.80	.704
1937–38						
October	2,810	96	295	1.53	1.76	0.989
November	2,210	160	306	1.59	1.77	1.03
December	251	175	202	1.05	1.21	.679
January	752	150	219	1.13	1.31	.730
February	638	165	252	1.31	1.36	.847
March	752	217	285	1.48	1.70	.957
April	412	165	215	1.11	1.24	.717
May	308	129	172	.891	1.03	.576
June	3,780	117	323	1.67	1.87	1.08
July	1,280	133	352	1.82	2.10	1.18
August	980	111	221	1.15	1.32	.743
September	1,050	97	206	1.07	1.19	.692
The year	3,780	96	254	1.32	17.86	.853
1938–39						
October	369	130	167	0.865	1.00	0.559
November	249	120	149	.772	.86	.499
December	1,120	173	296	1.53	1.77	.989
January	1,790	130	255	1.32	1.53	.853
February	1,530	346	557	2.89	3.01	1.87
March	1,120	367	478	2.48	2.85	1.60
April	910	367	482	2.50	2.79	1.62
May	814	198	297	1.54	1.78	.995
June	1,750	170	273	1.41	1.58	.911
July	458	127	194	1.01	1.16	.653
August	934	99	190	.984	.113	.636
September	308	91	119	.617	.69	.399
The year	1,790	91	286	1.48	20.15	.957

Monthly discharge of Octoraro Creek near Rising Sun—*Continued*

Month	Observed discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1939–40						
October	2,050	113	250	1.30	1.49	0.840
November	458	112	147	.762	.85	.492
December	288	110	138	.715	.82	.462
January	1,300	105	172	.891	1.03	.576
February	980	110	258	1.34	1.44	.866
March	1,690	174	352	1.82	2.10	1.18
April	1,830	215	450	2.33	2.60	1.51
May	752	215	310	1.61	1.85	1.04
June	482	159	220	1.14	1.27	.737
July	262	96	137	.710	.82	.459
August	296	83	128	.663	.77	.429
September	1,320	93	191	.990	1.10	.640
The year	2,050	83	229	1.19	16.14	.769
1940–41						
October	314	96	135	0.699	0.81	0.452
November	1,280	111	262	1.36	1.51	.879
December	583	164	233	1.21	1.39	.782
January	991	170	263	1.36	1.57	.879
February	1,330	150	288	1.49	1.55	.963
March	1,250	151	341	1.77	2.03	1.14
April	502	162	235	1.22	1.36	.789
May	194	107	137	.710	.82	.459
June	413	94	154	.798	.89	.516
July	858	82	192	.995	1.15	.643
August	528	58	90.8	.470	.54	.304
September	282	44	66.3	.344	.38	.222
The year	1,330	44	199	1.03	14.00	.666
1941–42						
October	66	33	53.3	0.276	0.32	0.178
November	137	47	67.4	.349	.39	.226
December	722	47	111	.575	.66	.372
January	371	70	101	.523	.60	.338
February	1,930	80	210	1.09	1.13	.704
March	1,380	83	256	1.33	1.53	.860
April	352	115	173	.896	1.00	.579
May	9,270	96	625	3.24	3.74	2.09
June	482	123	202	1.05	1.17	.679
July	1,120	101	197	1.02	1.18	.659
August	15,000	125	790	4.09	4.72	2.64
September	545	105	161	.834	.93	.539
The year	15,000	33	247	1.28	17.37	.827

Monthly discharge of Octoraro Creek near Rising Sun—*Continued*

Month	Observed discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1942–43						
October	996	113	248	1.28	1.48	0.827
November	600	157	236	1.22	1.36	.789
December	1,740	160	384	1.99	2.29	1.29
January	560	218	286	1.48	1.71	.957
February	1,330	143	403	2.09	2.17	1.35
March	911	218	382	1.98	2.28	1.28
April	962	234	327	1.69	1.89	1.09
May	1,500	218	380	1.97	2.27	1.27
June	305	157	218	1.13	1.26	.730
July	1,520	129	231	1.20	1.38	.776
August	134	68	96.7	.501	.58	.324
September	83	45	66.4	.344	.38	.222
The year	1,740	45	271	1.40	19.05	.905
1943–44						
October	820	54	145	0.751	0.87	0.485
November	2,200	115	233	1.21	1.35	.782
December	1,140	78	137	.710	.82	.459
January	4,430	90	382	1.98	2.28	1.28
February	738	80	155	.803	.86	.519
March	1,360	102	333	1.73	1.99	1.12
April	1,120	189	318	1.65	1.84	1.07
May	325	159	221	1.15	1.32	.743
June	500	111	156	.808	.90	.522
July	123	40	83.2	.431	.50	.279
August	293	39	74.4	.385	.44	.249
September	875	32	93.6	.485	.54	.313
The year	4,430	32	194	1.01	13.71	.653
1944–45						
October	114	58	76.3	0.395	0.46	0.255
November	690	52	113	.585	.65	.378
December	1,000	100	182	.943	1.09	.609
January	1,560	118	197	1.02	1.18	.659
February	1,570	112	378	1.96	2.04	1.27
March	600	164	255	1.32	1.52	.853
April	1,020	129	202	1.05	1.17	.679
May	313	120	169	.876	1.01	.566
June	809	89	190	.984	1.10	.636
July	4,430	92	541	2.80	3.23	1.81
August	560	164	249	1.29	1.49	.834
September	1,430	124	258	1.34	1.49	.866
The year	4,430	52	234	1.21	16.43	.782

Monthly discharge of Octoraro Creek near Rising Sun—*Continued*

Month	Observed discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1945–46						
October	275	137	170	0.881	1.01	0.569
November	1,970	122	277	1.44	1.60	.931
December	1,790	198	366	1.90	2.19	1.23
January	545	210	299	1.55	1.78	1.00
February	1,130	174	289	1.50	1.56	.969
March	605	211	283	1.47	1.69	.950
April	258	164	198	1.03	1.14	.666
May	1,520	150	376	1.95	2.25	1.26
June	4,390	226	557	2.89	3.22	1.87
July	2,460	175	304	1.58	1.82	1.02
August	687	144	203	1.05	1.21	.679
September	305	116	156	.808	.90	.522
The year	4,390	116	290	1.50	20.37	.969
1946–47						
October	282	130	162	0.839	0.97	0.542
November	187	120	135	.699	.78	.452
December	594	100	151	.782	.90	.505
January	361	140	194	1.01	1.16	.653
February	183	48	147	.762	.79	.492
March	813	150	249	1.29	1.49	.834
April	346	156	192	.995	1.11	.643
May	874	156	305	1.58	1.82	1.02
June	1,110	174	281	1.46	1.62	.944
July	2,090	150	288	1.49	1.72	.963
August	413	106	140	.725	.84	.469
September	150	92	118	.611	.68	.395
The year	2,090	48	197	1.02	13.88	.659
1947–48						
October	200	60	81.6	0.422	0.49	0.273
November	887	86	244	1.26	1.41	.814
December	461	115	147	.762	.88	.492
January	1,720	132	280	1.45	1.67	.937
February	1,970	130	406	2.10	2.27	1.36
March	488	229	299	1.55	1.79	1.00
April	900	220	300	1.55	1.73	1.00
May	1,430	214	461	2.39	2.75	1.54
June	1,510	248	360	1.87	2.08	1.21
July	510	168	237	1.23	1.41	.795
August	494	141	210	1.09	1.26	.704
September	577	112	174	.902	1.00	.583
The year	1,970	60	266	1.38	18.74	.892

Monthly discharge of Octoraro Creek near Rising Sun—*Continued*

Month	Observed discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1948–49						
October	211	97	123	0.637	0.74	0.412
November	613	103	169	.876	.98	.566
December	1,580	124	279	1.45	1.67	.937
January	1,520	248	468	2.42	2.80	1.56
February	701	381	482	2.50	2.60	1.62
March	1,120	302	375	1.94	2.24	1.25
April	555	267	342	1.77	1.98	1.14
May	539	220	291	1.51	1.74	.976
June	217	126	164	.850	.95	.549
July	2,000	118	320	1.66	1.91	1.07
August	1,780	112	211	1.09	1.26	.704
September	156	83	109	.565	.63	.365
The year	2,000	83	277	1.44	19.50	.931
1949–50						
October	285	82	118	0.611	0.71	0.395
November	221	90	116	.601	.67	.388
December	711	92	176	.912	1.05	.589
January	211	122	147	.762	.88	.492
February	578	155	286	1.48	1.55	.957
March	1,890	140	358	1.85	2.14	1.20
April	351	217	257	1.33	1.49	.860
May	657	195	267	1.38	1.59	.892
June	399	148	213	1.10	1.23	.711
July	1,030	114	184	.953	1.10	.616
August	1,360	90	171	.886	1.02	.573
September	355	85	148	.767	.85	.496
The year	1,890	82	203	1.05	14.28	.679
1950–51						
October	850	104	159	0.824	0.95	0.533
November	2,710	108	274	1.42	1.59	.918
December	1,250	169	328	1.70	1.96	1.10
January	1,830	172	293	1.52	1.75	.982
February	2,080	80	424	—	—	—
March	626	55	200	—	—	—
April	844	229	317	—	—	—
May	470	174	222	—	—	—
June	683	161	257	—	—	—
July	1,670	161	338	—	—	—
August	964	110	179	—	—	—
September	199	71	107	—	—	—
The year	2,710	55	257	—	—	—

Monthly discharge of Octoraro Creek near Rising Sun—*Continued*

Month	Discharge in second-feet					Adjusted	
	Observed			Adjusted		Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Mean	Per square mile		
1951–52							
October	185	71	98.4	99.2	0.514	0.59	0.332
November	1,280	125	294	304	1.58	1.76	1.02
December	2,880	130	359	378	1.96	2.26	1.27
January	974	253	388	407	2.11	2.43	1.36
February	1,040	256	379	393	2.04	2.19	1.32
March	1,960	268	458	476	2.47	2.85	1.60
April	2,360	322	571	594	3.08	3.43	1.99
May	1,770	330	543	554	2.87	3.30	1.85
June	974	242	392	406	2.10	2.35	1.36
July	3,500	203	495	512	2.65	3.06	1.71
August	577	144	247	264	1.37	1.57	.885
September	3,160	147	334	353	1.83	2.04	1.18
The year	3,500	71	380	395	2.05	27.83	1.32
1952–53							
October	197	115	139	157	0.813	0.94	0.525
November	3,230	103	313	336	1.74	1.94	1.12
December	1,530	206	361	378	1.96	2.26	1.27
January	2,070	249	577	597	3.09	3.57	2.00
February	685	357	441	459	2.38	2.47	1.54
March	1,180	330	561	581	3.01	3.47	1.95
April	770	348	474	490	2.54	2.84	1.64
May	1,090	264	388	404	2.09	2.41	1.35
June	824	213	361	379	1.96	2.19	1.27
July	249	112	172	192	.995	1.15	.643
August	177	67	107	129	.668	.77	.432
September	396	57	108	133	.689	.77	.445
The year	3,230	57	333	352	1.82	24.78	1.18
1953–54							
October	436	54	89.6	121	0.627	0.73	0.405
November	225	78	139	158	.819	.92	.529
December	1,160	103	278	299	1.55	1.78	1.00
January	390	115	179	196	1.02	1.17	.659
February	219	110	146	166	.860	.90	.556
March	1,040	194	285	304	1.58	1.82	1.02
April	330	152	188	206	1.07	1.19	.692
May	656	130	204	220	1.14	1.32	.737
June	146	53	88.9	108	.560	.63	.362
July	72	24	42.1	65.3	.338	.39	.218
August	68	22	44.7	72.7	.377	.43	.244
September	59	30	42.1	66.6	.345	.39	.223
The year	1,160	22	144	166	.860	11.67	.556

SUSQUEHANNA RIVER BASIN—*Continued*

Monthly discharge of Octoraro Creek near Rising Sun—*Continued*

Month	Discharge in second-feet					Adjusted	
	Observed			Adjusted		Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Mean	Per square mile		
1954–55							
October	53	31	38.1	68.1	0.353	0.41	0.228
November	175	31	59.8	86.7	.449	.50	.290
December	311	42	91.0	116	.601	.70	.388
January	164	40	68.8	88.3	.458	.53	.296
February	2,240	45	192	220	1.14	1.19	.737
March	543	99	197	222	1.15	1.32	.743
April	309	95	145	169	.876	.98	.566
May	126	45	78.1	102	.528	.61	.341
June	1,300	45	199	226	1.17	1.31	.756
July	146	31	57.8	87.0	.451	.52	.291
August	5,240	30	616	653	3.38	3.90	2.18
September	235	110	150	173	.896	1.00	.579
The year	5,240	30	158	184	.953	12.97	.616
1955–56							
October	220	105	134	156	0.808	0.93	0.522
November	164	97	121	144	.746	.83	.482
December	110	70	88.2	111	.575	.66	.372
January	902	60	124	162	.839	.97	.542
February	1,290	162	342	360	1.87	2.01	1.21
March	920	137	319	346	1.79	2.07	1.16
April	525	189	258	283	1.47	1.63	.950
May	203	126	162	188	.974	1.12	.630
June	441	97	179	207	1.07	1.20	.692
July	497	91	154	181	.938	1.08	.606
August	323	54	94.9	122	.632	.73	.408
September	277	56	97.1	126	.653	.73	.422
The year	1,290	54	172	198	1.03	13.96	.666

Yearly discharge of Octoraro Creek near Rising Sun

Year	Year ending Sept. 30				Calendar year			
	*Discharge in second-feet		*Runoff in inches	*Discharge in million gallons per day per square mile	*Discharge in second-feet		*Runoff in inches	*Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1933	361	1.87	25.38	1.21	361	1.87	25.38	1.21
1934	244	1.26	17.14	.814	247	1.28	17.41	.827
1935	298	1.54	20.98	.995	303	1.57	21.30	1.01
1936	326	1.69	23.01	1.09	300	1.55	21.15	1.00
1937	210	1.09	14.80	.704	247	1.28	17.40	.827
1938	254	1.32	17.86	.853	238	1.23	16.75	.795
1939	286	1.48	20.15	.957	280	1.45	19.68	.937
1940	229	1.19	16.14	.769	237	1.23	16.69	.795
1941	199	1.03	14.00	.666	166	.860	11.66	.556
1942	247	1.28	17.37	.827	300	1.55	21.13	1.00
1943	271	1.40	19.05	.905	241	1.25	16.96	.808
1944	194	1.01	13.71	.653	182	.943	12.87	.609
1945	234	1.21	16.43	.782	271	1.40	19.03	.905
1946	290	1.50	20.37	.969	259	1.34	18.22	.866
1947	197	1.02	13.88	.659	199	1.03	14.01	.666
1948	266	1.38	18.74	.892	274	1.42	19.35	.918
1949	277	1.44	19.50	.931	263	1.36	18.54	.879
1950	203	1.05	14.28	.679	232	1.20	16.35	.776
1951	257	—	—	—	256	—	—	—
1952	395	2.05	27.83	1.32	402	2.08	28.36	1.34
1953	352	1.82	24.78	1.18	328	1.70	23.07	1.10
1954	166	.860	11.67	.556	139	.720	9.85	.465
1955	184	.953	12.97	.616	196	1.02	13.78	.659
1956	198	1.03	13.96	.666	—	—	—	—
Highest	395	2.05	27.83	1.32	402	2.08	28.36	1.34
Average	256	1.33	18.00	.860	257	1.33	18.13	.860
Lowest	166	.860	11.67	.556	139	.720	9.85	.465

* Adjusted for diversions and change in reservoir contents since 1952.

17. Basin Run at Liberty Grove

Location.—Lat. 39°39′30″, long. 76°06′10″, on left bank 100 feet upstream from highway bridge 0.9 mile east of Liberty Grove, Cecil County, 1.0 mile southwest of Colora, and 3 miles upstream from mouth.

Drainage area.—5.31 square miles.

Records available.—October 1948 to September 1956.

Gage.—Water-stage recorder and concrete control. Altitude of gage is 220 ft (from topographic map).

Average discharge.—8 years, 6.33 second-feet.

Extremes.—Maximum discharge, 1,440 second-feet July 4, 1951 (gage height, 6.06 feet), from rating curve extended above 150 second-feet on basis of slope-area determinations at gage heights 3.80 and 6.06 feet; minimum, 0.02 second-foot Aug. 3, 1955 (gage height, 0.69 foot); minimum daily, 0.6 second-foot Aug. 6, 1955.

Remarks.—Occasional diversions for irrigation of about 60 acres above station.

Monthly discharge of Basin Run at Liberty Grove

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1948–49						
October	9.0	3.5	4.33	0.815	0.94	0.527
November	29	3.5	5.60	1.05	1.18	.679
December	61	3.2	8.91	1.68	1.93	1.09
January	59	5.2	12.6	2.37	2.73	1.53
February	24	8.3	12.0	2.26	2.34	1.46
March	61	6.4	10.2	1.92	2.22	1.24
April	27	6.4	9.54	1.80	2.00	1.16
May	14	4.9	6.56	1.24	1.42	.801
June	5.6	3.7	4.53	.853	.95	.551
July	61	3.1	7.65	1.44	1.66	.931
August	15	2.3	3.56	.670	.77	.433
September	3.8	1.9	2.39	.450	.50	.291
The year	61	1.9	7.30	1.37	18.64	.885
1949–50						
October	11	2.1	3.52	0.663	0.76	0.429
November	4.8	2.3	2.96	.557	.62	.360
December	21	2.3	4.34	.817	.94	.528
January	11	2.5	3.53	.665	.77	.430
February	16	2.5	6.55	1.23	1.28	.795
March	65	2	9.63	1.81	2.09	1.17
April	13	4.6	5.78	1.09	1.22	.704
May	21	4.0	6.47	1.22	1.40	.789
June	13	2.8	4.87	.917	1.02	.593
July	42	2.3	4.04	.761	.88	.492
August	80	2.1	5.76	1.08	1.25	.698
September	17	1.9	4.49	.846	.94	.547
The year	80	1.9	5.16	.972	13.17	.628

Monthly discharge of Basin Run at Liberty Grove—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1950–51						
October	36	1.7	3.95	0.744	0.86	0.481
November	129	3.1	7.95	1.50	1.67	.969
December	67	3.7	9.60	1.81	2.08	1.17
January	67	4.3	8.97	1.69	1.95	1.09
February	68	4.0	12.7	2.39	2.50	1.54
March	42	5.6	10.0	1.88	2.17	1.22
April	26	6.0	8.22	1.55	1.73	1.00
May	11	3.7	5.14	.968	1.11	.626
June	17	3.7	5.60	1.05	1.18	.679
July	81	3.4	10.5	1.98	2.28	1.28
August	3.7	2.1	2.81	.529	.61	.342
September	2.5	1.3	1.79	.337	.38	.218
The year	129	1.3	7.24	1.36	18.52	.879
1951–52						
October	4.1	1.3	2.03	0.382	0.44	0.247
November	53	3.1	7.32	1.38	1.54	.892
December	127	3.1	10.4	1.96	2.26	1.27
January	29	5.2	9.64	1.82	2.09	1.18
February	49	5.6	8.76	1.65	1.78	1.07
March	114	6.0	13.6	2.56	2.94	1.65
April	58	7.3	14.5	2.73	3.04	1.76
May	63	7.8	14.5	2.73	3.14	1.76
June	22	5.6	7.83	1.47	1.65	.950
July	100	4.6	10.1	1.90	2.18	1.23
August	23	3.7	6.01	1.13	1.31	.730
September	56	3.7	6.61	1.24	1.39	.801
The year	127	1.3	9.27	1.75	23.76	1.13
1952–53						
October	4.2	2.9	3.18	0.599	0.69	0.387
November	89	2.9	8.80	1.66	1.85	1.07
December	64	4.7	9.04	1.70	1.96	1.10
January	80	5.8	15.4	2.90	3.35	1.87
February	38	7.2	10.7	2.02	2.10	1.31
March	36	7.2	13.4	2.52	2.92	1.63
April	29	8.2	11.6	2.18	2.43	1.41
May	90	6.3	12.7	2.39	2.76	1.54
June	25	4.7	7.98	1.50	1.68	.969
July	8.7	2.9	4.25	.800	.92	.517
August	4.0	1.8	2.55	.480	.55	.310
September	21	1.8	3.34	.629	.70	.407
The year	90	1.8	8.57	1.61	21.91	1.04

Monthly discharge of Basin Run at Liberty Grove—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1953–54						
October	27	2.0	3.28	0.618	0.71	0.399
November	7	2.4	4.03	.759	.85	.491
December	50	3.2	7.55	1.42	1.64	.918
January	17	2.5	4.95	.932	1.07	.602
February	9.0	2.9	4.06	.765	.80	.494
March	36	4.7	7.75	1.46	1.68	.944
April	31	4.0	7.19	1.35	1.51	.873
May	60	4.2	8.17	1.54	1.77	.995
June	4.2	1.7	3.14	.591	.66	.382
July	2.8	1.0	1.96	.369	.43	.238
August	6.1	.9	1.85	.348	.40	.225
September	2.7	1.0	1.36	.256	.29	.165
The year	60	.9	4.62	.870	11.81	.562
1954–55						
October	4.0	1.1	1.57	0.296	0.34	0.191
November	6.7	1.4	2.15	.405	.45	.262
December	15	1.6	2.99	.563	.65	.364
January	3.4	1.4	2.18	.411	.47	.266
February	69	1.6	6.56	1.24	1.29	.801
March	29	3.4	6.27	1.18	1.36	.763
April	15	3.2	4.60	.866	.97	.560
May	3.8	2.2	2.82	.531	.61	.343
June	18	1.8	5.16	.972	1.08	.628
July	2.4	1.2	1.69	.318	.37	.206
August	143	.6	14.2	2.67	3.09	1.73
September	6.8	2.2	3.19	.601	.67	.388
The year	143	.6	4.44	.836	11.35	.540
1955–56						
October	6.2	2.6	3.24	0.610	0.70	0.394
November	6.0	2.6	3.20	.603	.67	.390
December	3.1	2.4	2.66	.501	.58	.324
January	32	1.9	3.48	.655	.76	.423
February	33	3.2	7.89	1.49	1.60	.963
March	52	2.9	7.19	1.35	1.56	.873
April	17	4.0	5.63	1.06	1.18	.685
May	6.8	2.9	3.78	.712	.82	.460
June	11	2.2	3.41	.642	.72	.415
July	26	2.0	3.63	.684	.79	.442
August	19	1.6	2.67	.503	.58	.325
September	12	1.4	2.23	.420	.47	.271
The year	52	1.4	4.07	.766	10.43	.495

SUSQUEHANNA RIVER BASIN—*Continued*

Yearly discharge of Basin Run at Liberty Grove

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1949	7.30	1.37	18.64	0.885	6.62	1.25	16.91	0.808
1950	5.16	.972	13.17	.628	6.05	1.14	15.46	.737
1951	7.24	1.36	18.52	.879	7.10	1.34	18.15	.866
1952	9.27	1.75	23.76	1.13	9.37	1.76	24.02	1.14
1953	8.57	1.61	21.91	1.04	8.07	1.52	20.61	.982
1954	4.62	.870	11.81	.562	3.93	.740	10.05	.478
1955	4.44	.836	11.35	.540	4.64	.874	11.86	.565
1956	4.07	.766	10.43	.495	—	—	—	—
Highest	9.27	1.75	23.76	1.13	9.37	1.76	24.02	1.14
Average	6.33	1.19	16.20	.769	6.54	1.23	16.72	.795
Lowest	4.07	.766	10.43	.495	3.93	.740	10.05	.478

SUSQUEHANNA RIVER BASIN

18. Octoraro Creek at Rowlandsville

Location.—Lat. 39°39′40″, long. 76°08′47″, on upstream side of highway bridge at Rowlandsville, Cecil County, immediately downstream from Basin Run, and 0.7 mile upstream from mouth.

Drainage area.—210 square miles.

Records available.—November 1896 to September 1899.

Gage.—Wire-weight gage read twice daily. Altitude of gage is 45 feet (from topographic map).

Extremes.—Maximum gage height observed, 12.4 feet Feb. 6, 1897 (discharge not determined); minimum discharge observed, 95 cfs Sept. 6, 1899; minimum gage height observed, 2.8 feet on many days in August, September and October 1897.

Observer noted that flood of Feb. 6, 1897 was maximum reached since June 26, 1884.

Remarks.—High stages of Susquehanna River probably cause backwater.

Monthly discharge of Octoraro Creek at Rowlandsville

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1896–97						
November 22–30	540	145	211	1.00	0.34	0.646
December	225	145	158	.752	.87	.486
January	2,580	155	329	1.57	1.80	1.01
February	6,150	170	1,021	4.86	5.06	3.14
March	500	170	230	1.10	1.26	.711
April	2,000	170	370	1.76	1.97	1.14
May	920	170	321	1.53	1.76	.989
June	1,270	145	222	1.06	1.18	.685
July	520	135	192	.914	1.06	.591
August	960	130	186	.886	1.02	.573
September	170	130	136	.648	.72	.419
The year						
1897–98						
October	170	130	141	0.671	0.77	0.434
November	1,840	155	298	1.42	1.58	.918
December	820	185	275	1.31	1.51	.847
January	705	220	306	1.46	1.68	.944
February	985	220	325	1.55	1.61	1.00
March	985	245	315	1.50	1.73	.969
April	535	245	322	1.53	1.71	.989
May	1,070	300	523	2.49	2.87	1.61
June	562	220	282	1.34	1.50	.866
July	375	200	230	1.10	1.26	.711
August	1,690	200	415	1.98	2.28	1.28
September	480	180	243	1.16	1.29	.750
The year	1,840	130	306	1.46	19.79	.944

SUSQUEHANNA RIVER BASIN—*Continued*

Monthly discharge of Octoraro Creek at Rowlandsville—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1898–99						
October	375	200	225	1.07	1.24	0.692
November	1,600	220	650	3.10	3.45	2.00
December	3,320	245	951	4.53	5.22	2.93
January	1,470	225	642	3.06	3.52	1.98
February	1,950	325	822	3.91	4.08	2.53
March	2,090	285	763	3.63	4.19	2.35
April	960	345	508	2.42	2.70	1.56
May	525	305	388	1.85	2.13	1.20
June	345	185	254	1.21	1.35	.782
July	345	130	188	.895	1.03	.578
August	960	120	181	.862	.99	.557
September	1,470	102	262	1.25	1.39	.808
The year	3,320	102	484	2.30	31.29	1.49

Yearly discharge of Octoraro Creek at Rowlandsville

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1897	—	—	—	—	305	1.45	19.69	0.937
1898	306	1.46	19.79	0.944	400	1.90	25.84	1.23
1899	484	2.30	31.29	1.49	—	—	—	—

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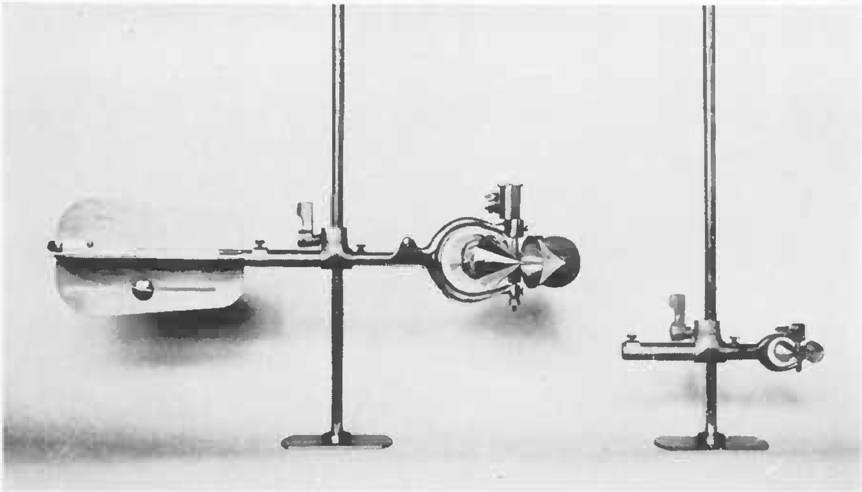


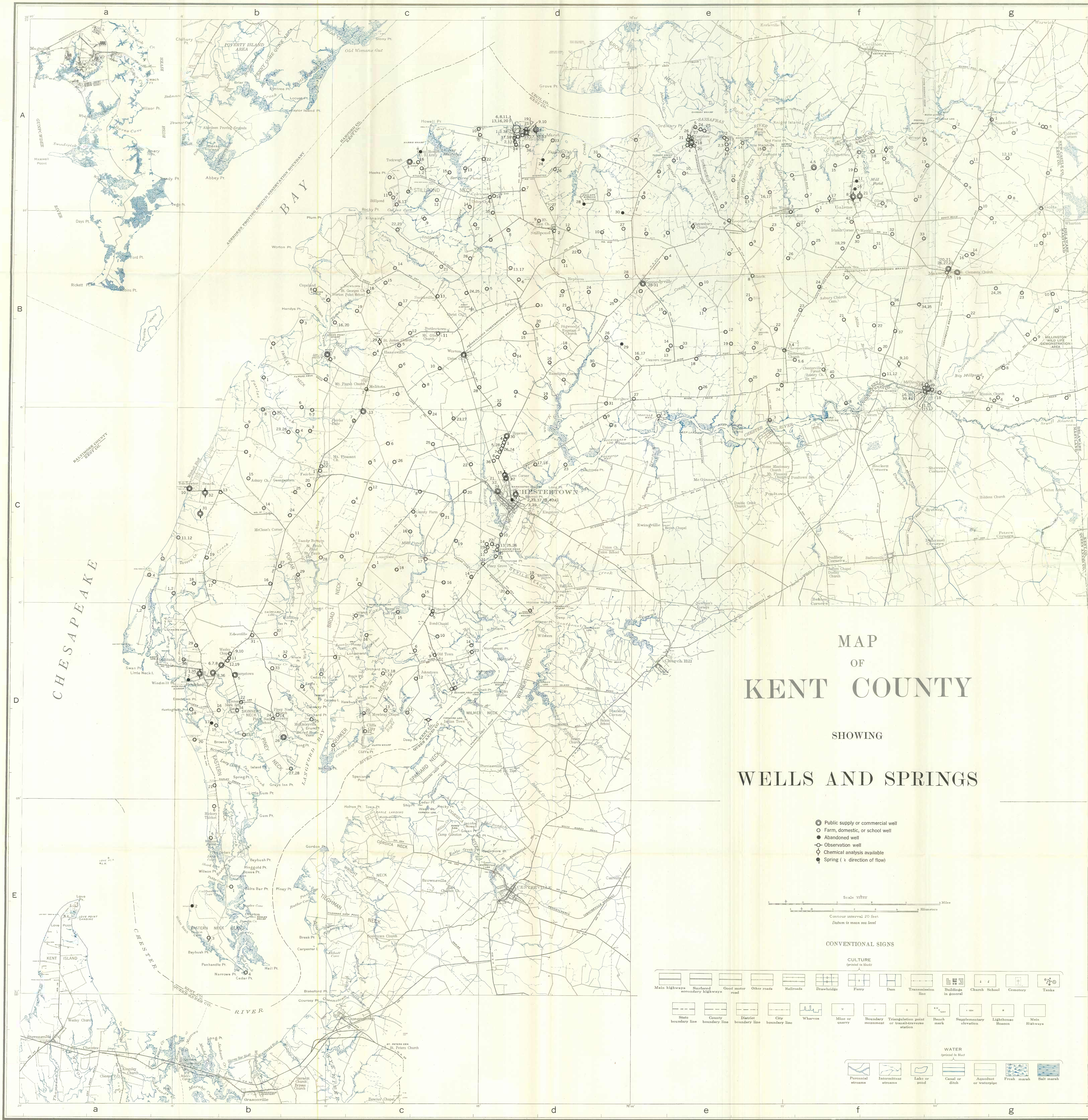
FIGURE 1. Price Standard Current Meter and Pygmy Meter suspended on Wading Rods, used to measure discharge

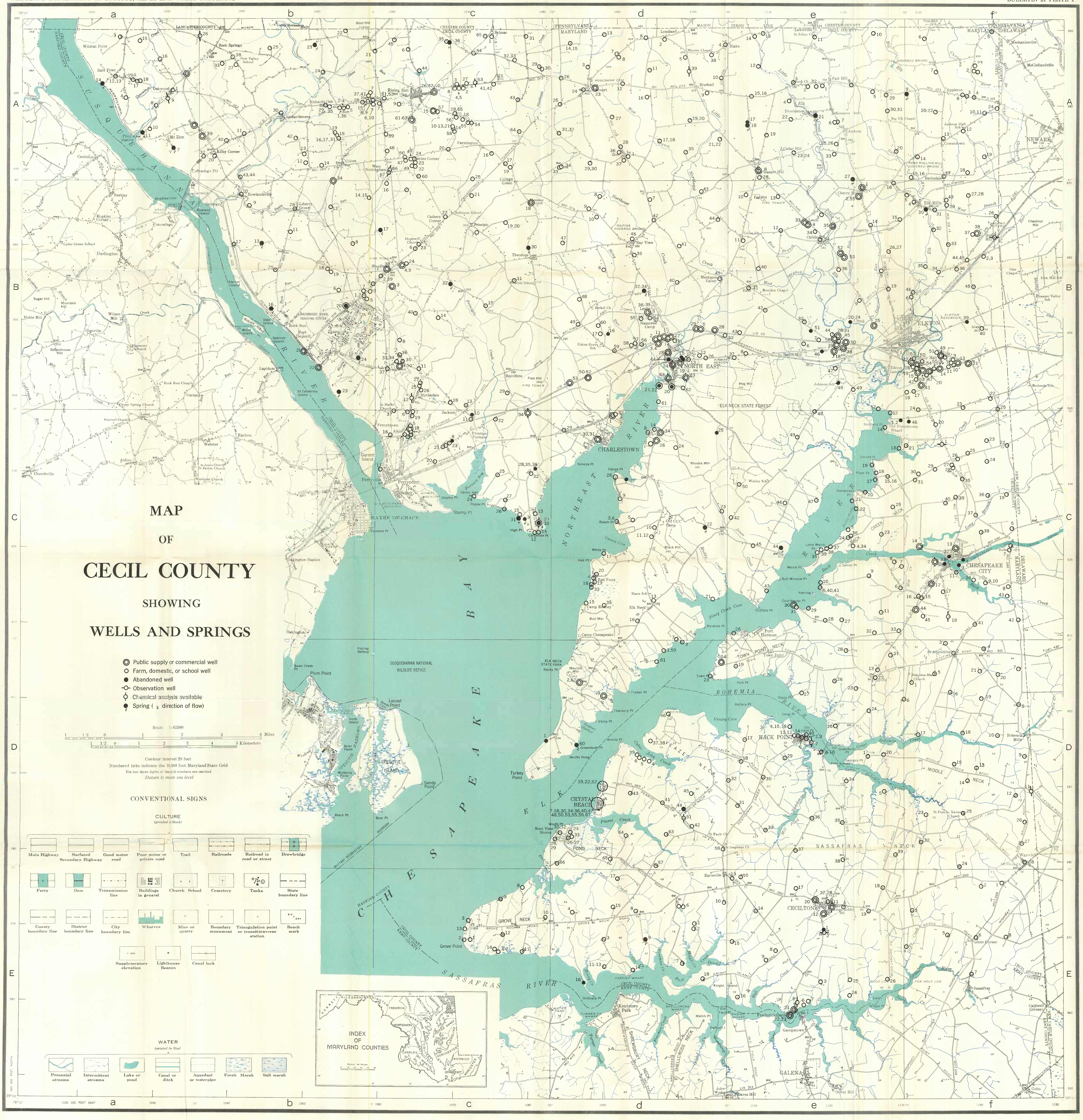
FIGURE 2. Engineer making discharge measurement by wading

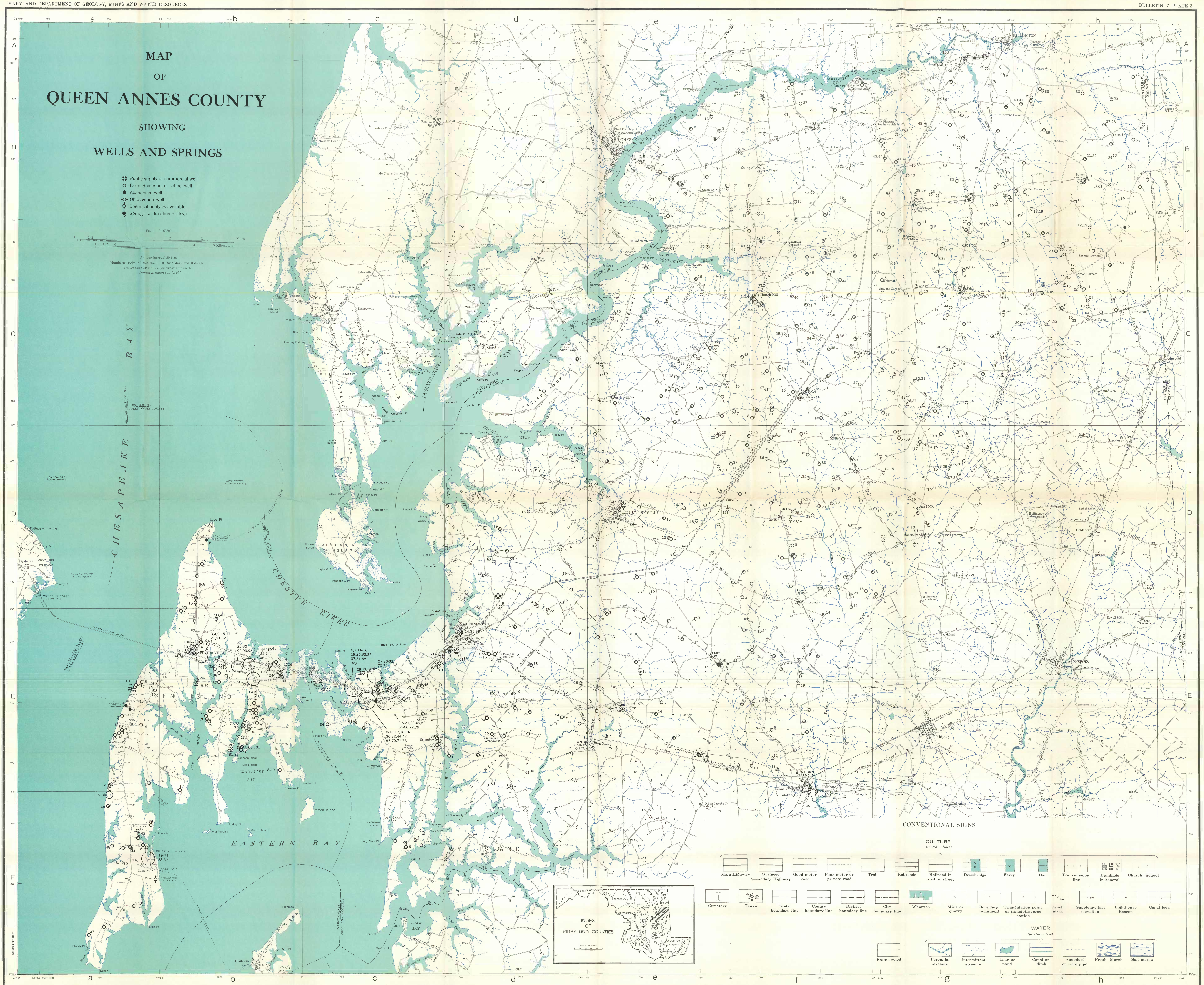
FIGURE 1. Gage House on Little Elk Creek at Childs, Cecil County

FIGURE 2. Gage House on Jacobs Creek near Sassafras, Kent County

INDEX


MAP OF KENT COUNTY
SHOWING
WELLS AND SPRINGS
Public supply or commercial well
Farm, domestic, or school well
Abandoned well
Observation well
Chemical analysis available
Spring (direction of flow)
Contour interval 20 feet
Datum is mean sea level
CONVENTIONAL SIGNS
CULTURE
Main highways
Surfaced secondary highways
Good motor road
Other roads
Railroads
Drawbridge
Ferry
Dam
Transmission line
Buildings in general
Church
School
Cemetery
Tanks
State boundary line
County boundary line
District boundary line
City boundary line
Wharves
Mine or quarry
Boundary monument
Triangulation point or transit-traverse station
Bench mark
Supplementary elevation
Lighthouse Beacon
Mole Highways
WATER
Perennial streams
Intermittent streams
Lake or pond
Canal or ditch
Aqueduct or waterpipe
Fresh marsh
Salt marsh
CHESAPEAKE
BAY
CHESTER RIVER
CHESTERTOWN
CENTREVILLE
KENT ISLAND
Lith. A. Hoen & Co., Inc.


MAP
OF
CECIL COUNTY
SHOWING
WELLS AND SPRINGS
Public supply or commercial well
Farm, domestic, or school well
Abandoned well
Observation well
Chemical analysis available
Spring (direction of flow)
Scale 1:62500
Contour interval 20 feet
Numbered ticks indicate the 10,000 foot Maryland State Grid
Datum is mean sea level
CONVENTIONAL SIGNS
CULTURE
(printed in black)
Main Highway
Surfaced Secondary Highway
Good motor road
Poor motor or private road
Trail
Railroads
Railroad in road or street
Drawbridge
Ferry
Dam
Transmission line
Buildings in general
Church
School
Cemetery
Tanks
State boundary line
County boundary line
District boundary line
City boundary line
Wharves
Mine or quarry
Boundary monument
Triangulation point or transit-traverse station
Bench mark
Supplementary elevation
Lighthouse Beacon
Canal lock
WATER
(printed in blue)
Perennial streams
Intermittent streams
Lake or pond
Canal or ditch
Aqueduct or waterpipe
Fresh Marsh
Salt marsh
INDEX OF MARYLAND COUNTIES
CHESAPEAKE BAY
SUSQUEHANNA RIVER
NORTHEAST RIVER
ELK RIVER
BOHEMIA RIVER
SASSAFRAS RIVER
ELKTON
NORTH EAST
CHARLESTOWN
CHESAPEAKE CITY
CECILTON
HAVRE DE GRACE
PERRYVILLE
RISING SUN
NEWARK
GALENA
HACK POINT
CRYSTAL BEACH


MAP
OF
QUEEN ANNES COUNTY
SHOWING
WELLS AND SPRINGS
Public supply or commercial well
Farm, domestic, or school well
Abandoned well
Observation well
Chemical analysis available
Spring (direction of flow)
Scale 1:62500
Miles
Kilometers
Contour interval 20 feet
Numbered ticks indicate the 10,000 foot Maryland State Grid
The last three digits of the grid numbers are omitted
Datum is mean sea level
CHESAPEAKE BAY
CHESTER RIVER
EASTERN BAY
KENT ISLAND
WYE ISLAND
CHESTERTOWN
CENTREVILLE
QUEENSTOWN
SUDLERSVILLE
CHURCH HILL
GRASONVILLE
STEVENSVILLE
EASTERN NECK ISLAND
CORSICA NECK
CRAB ALLEY BAY
INDEX OF MARYLAND COUNTIES
CONVENTIONAL SIGNS
CULTURE
(printed in black)
Main Highway
Surfaced Secondary Highway
Good motor road
Poor motor or private road
Trail
Railroads
Railroad in road or street
Drawbridge
Ferry
Dam
Transmission line
Buildings in general
Church
School
Cemetery
Tanks
State boundary line
County boundary line
District boundary line
City boundary line
Wharves
Mine or quarry
Boundary monument
Triangulation point or transit-traverse station
Bench mark
Supplementary elevation
Lighthouse Beacon
Canal lock
WATER
(printed in blue)
State owned
Perennial streams
Intermittent streams
Lake or pond
Canal or ditch
Aqueduct or waterpipe
Fresh Marsh
Salt marsh

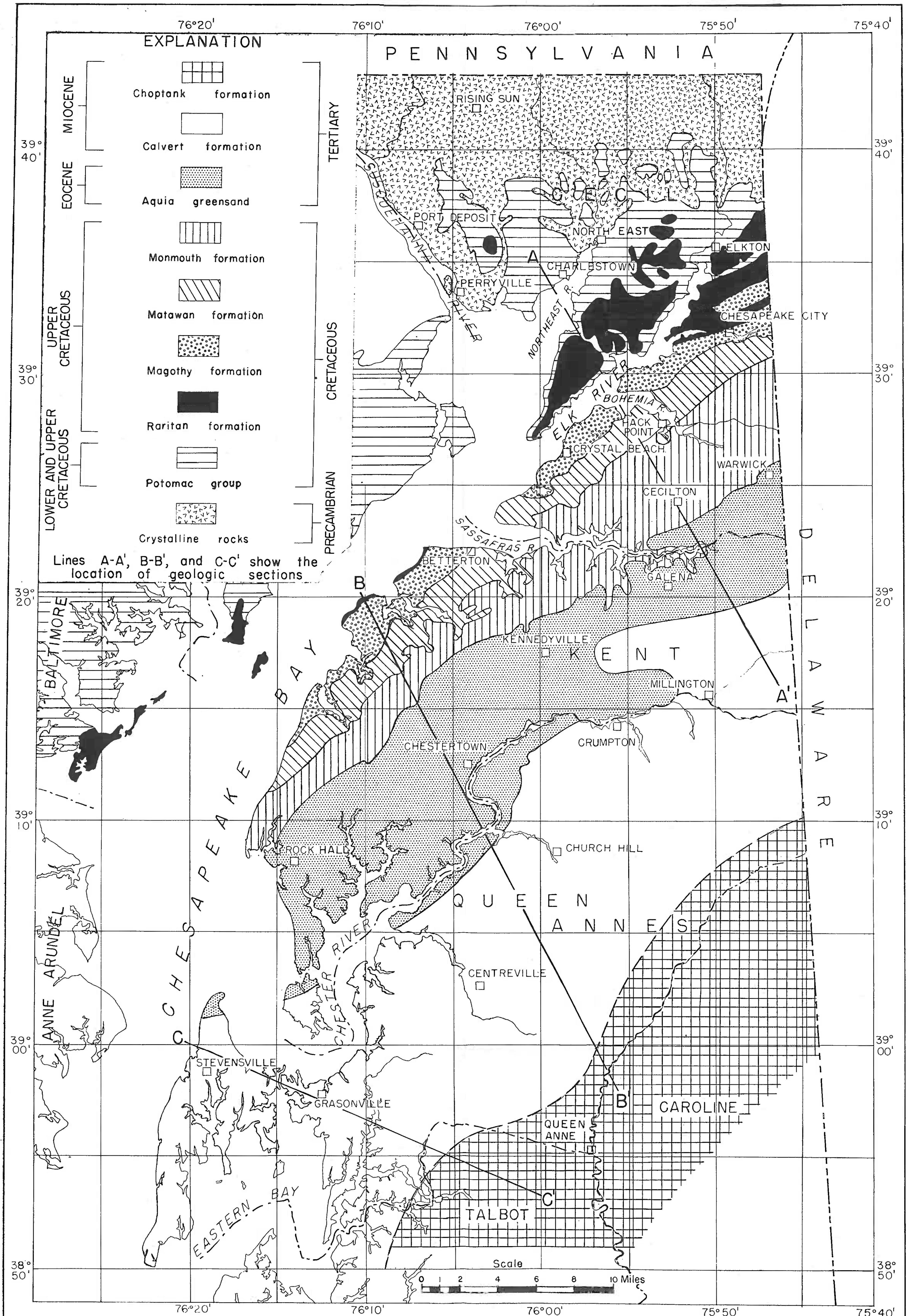


PLATE 4. Map of Pre-Pliocene Rocks of the Upper Chesapeake Bay Area

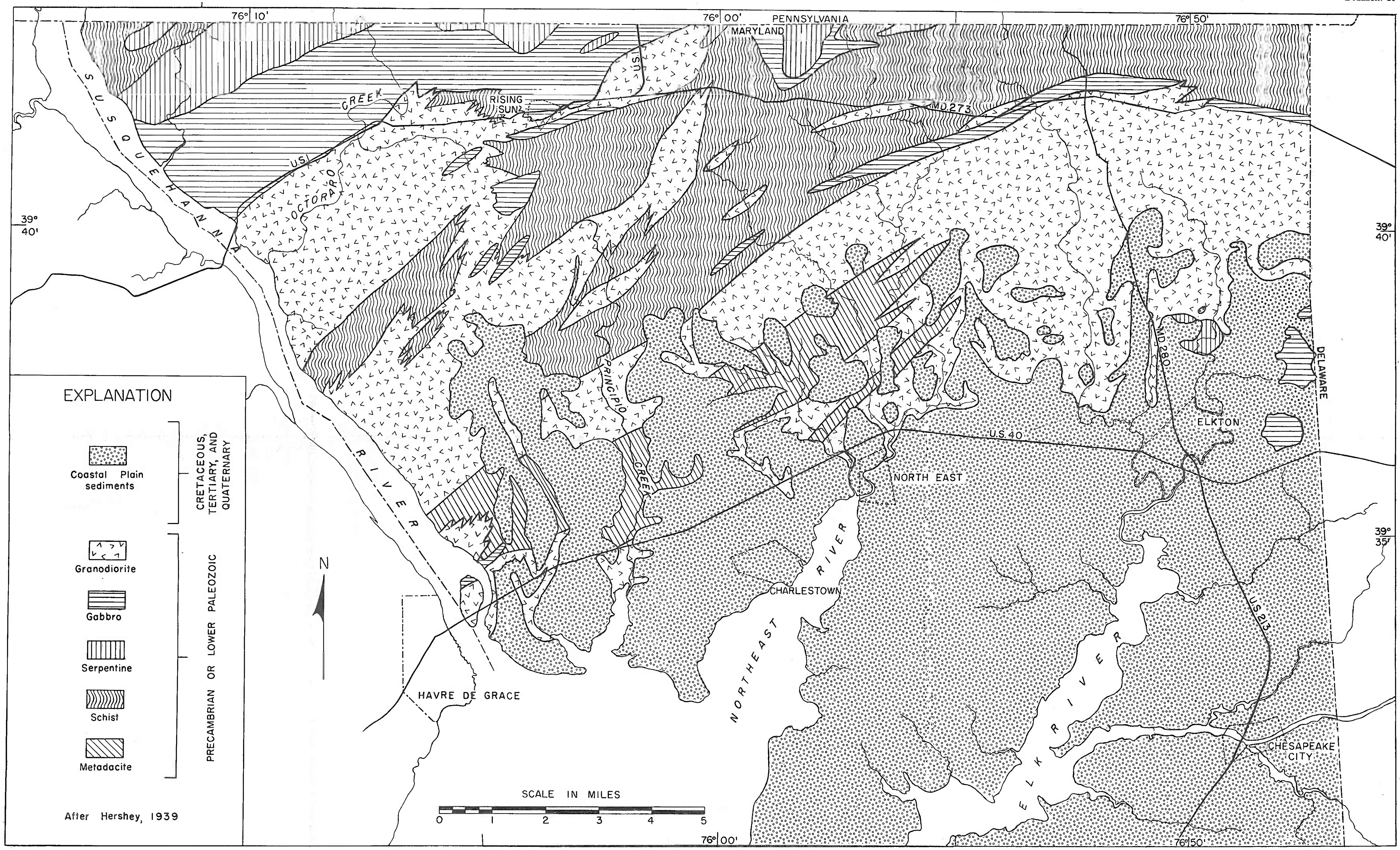


Plate 5. Geologic Map of the Crystalline Rocks of Northern Cecil County

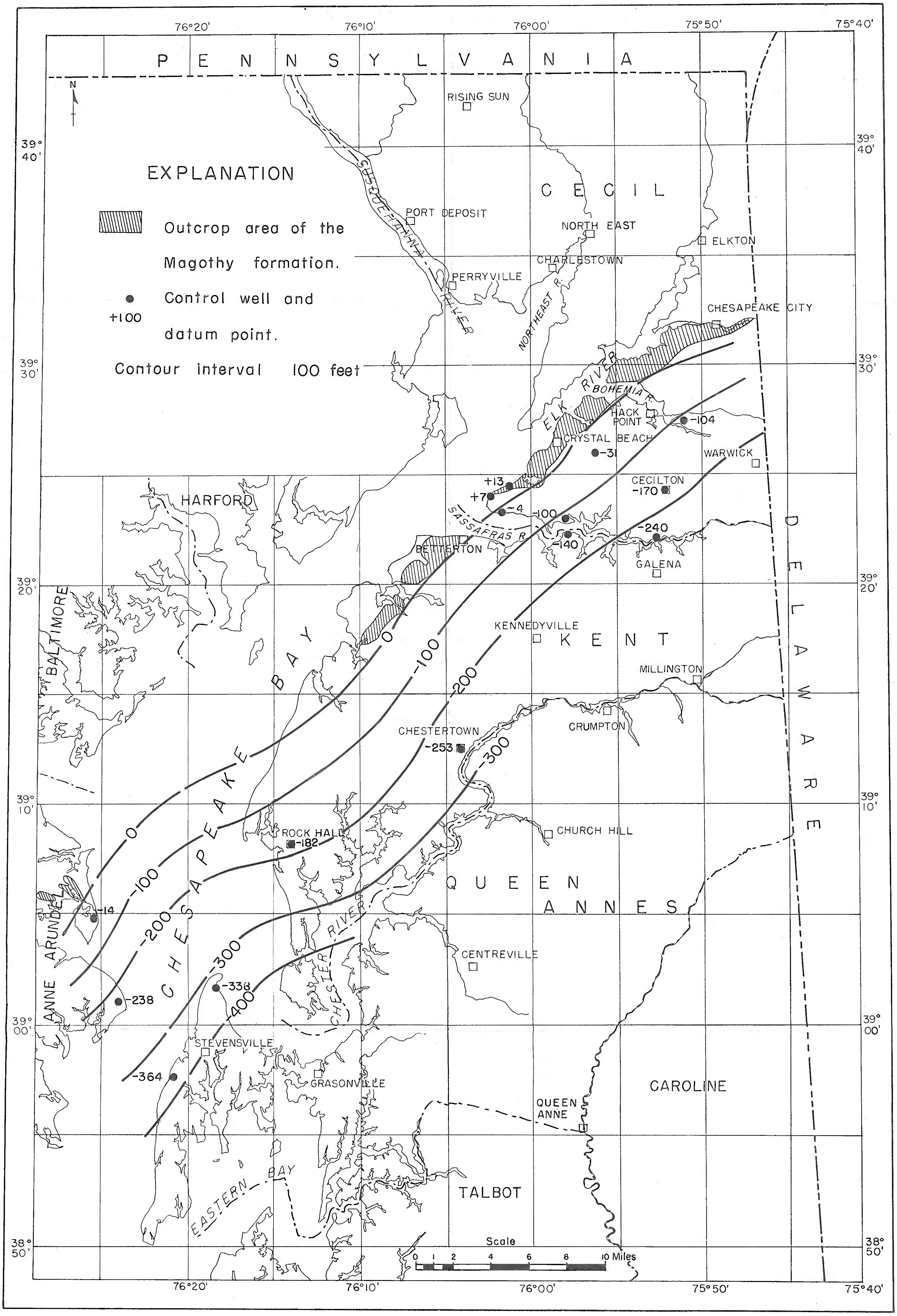


Plate 6. Map showing the Approximate Altitude of the Top of the Magothy Formation

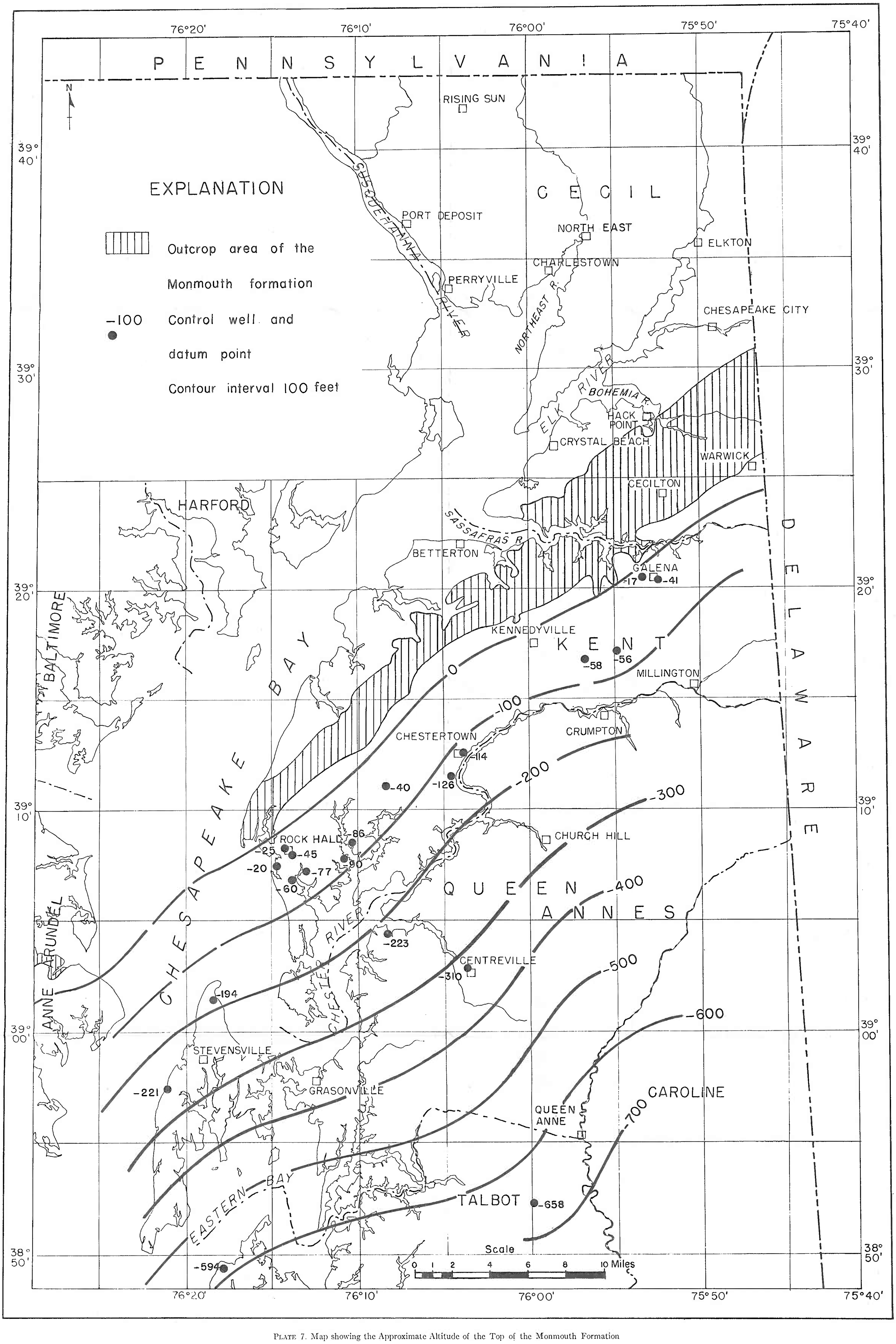


Plate 7. Map showing the Approximate Altitude of the Top of the Monmouth Formation

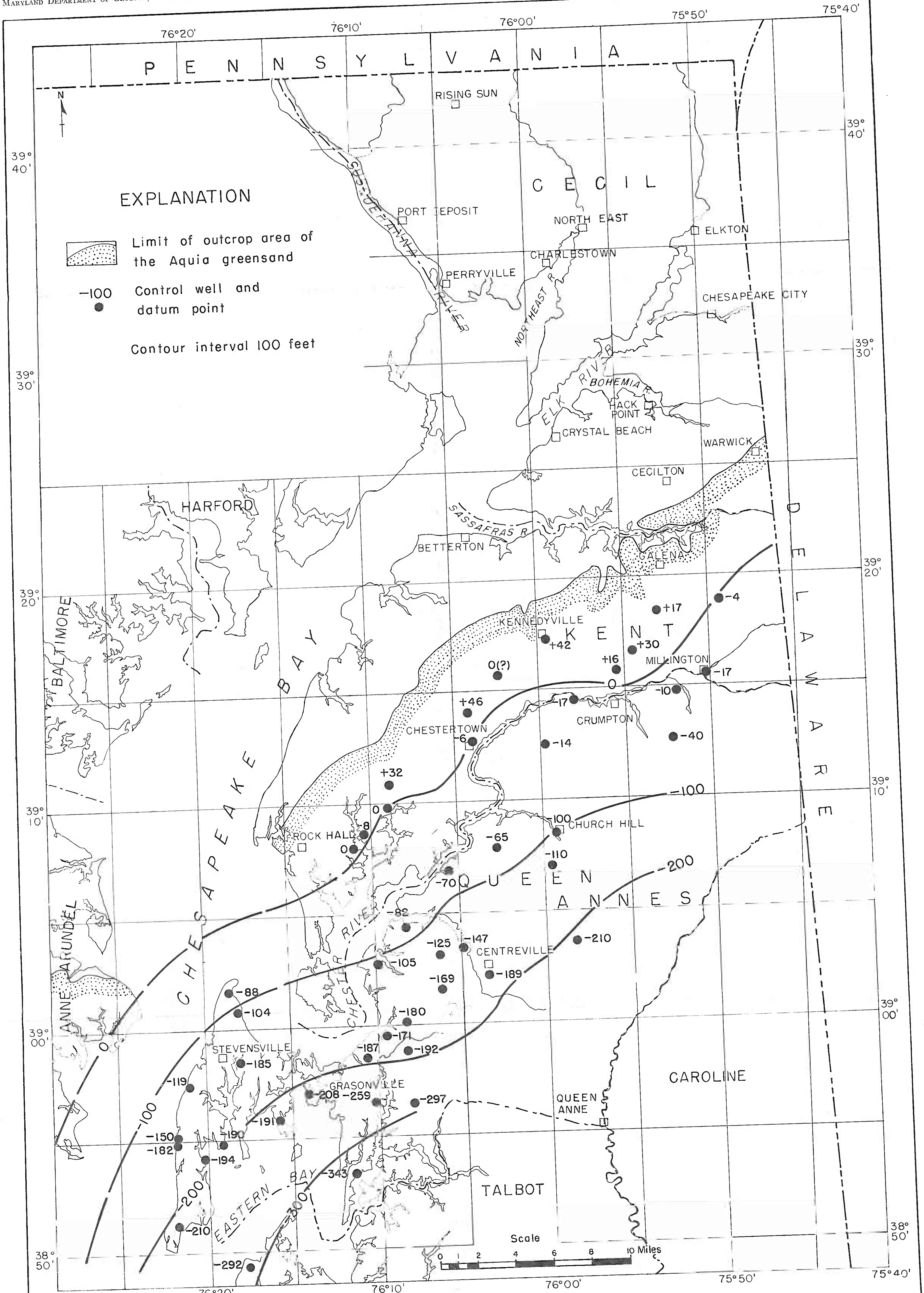


Plate 8. Map showing the Approximate Altitude of the Top of the Aquia Greensand

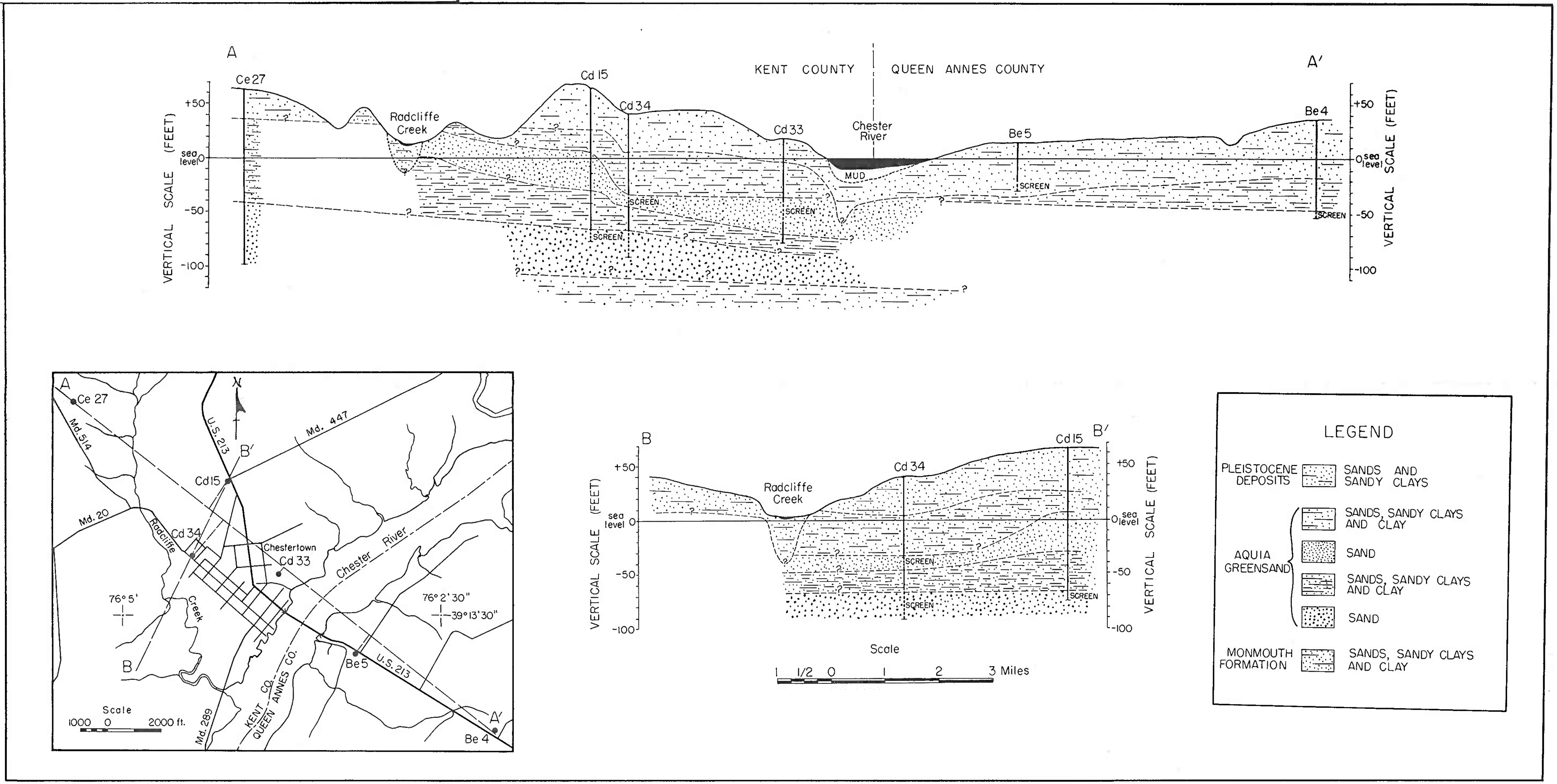


Plate 9. Geologic Sections and Map showing Locations of Wells in the Vicinity of Chestertown

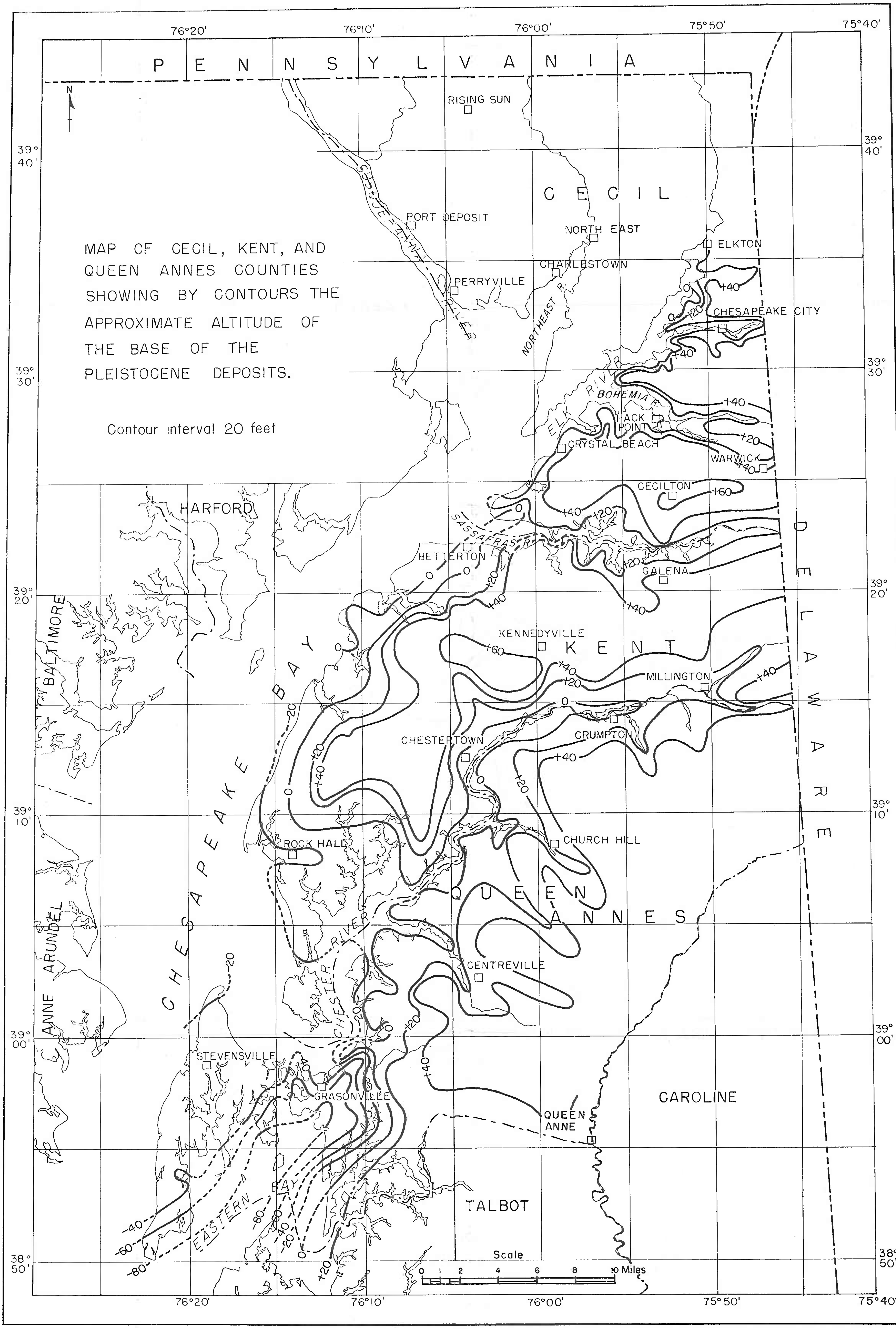


Plate 10. Map showing the Altitude of the Base of the Pleistocene Deposits

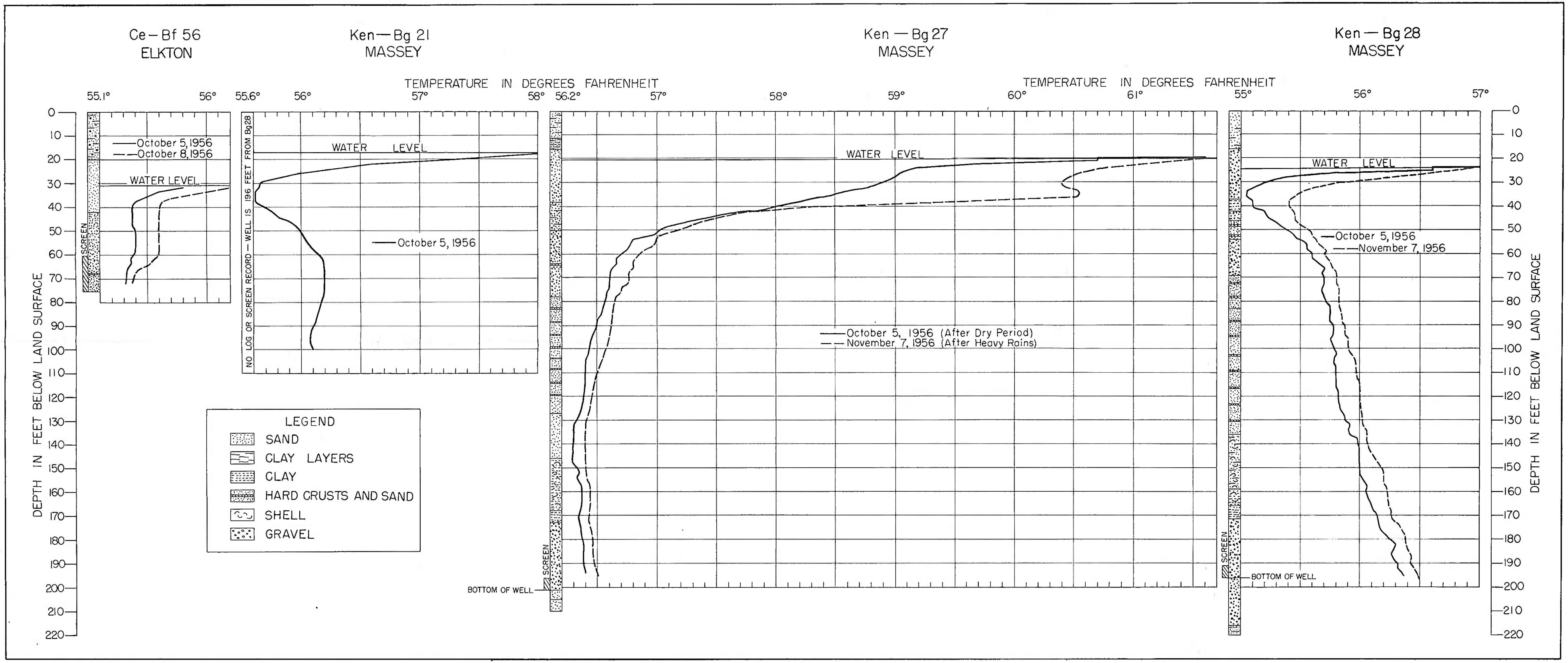


Plate 11. Temperature Logs of Four Non-pumping Wells in the Coastal Plain